Supervisor Glover

CONDITION OF APPROVAL:

Immediately after the Board of Supervisors approves this Land Use Permit application (County File No. LP12-2073), Phillips 66 will begin working with County staff to negotiate a mutually agreeable Community Benefits Agreement between Phillips 66 and the County. No later than 60 days after the Board of Supervisors approves this Land Use Permit application, Phillips 66 will deliver to the County the signed, negotiated Community Benefits Agreement requiring Phillips 66 to pay up to $4,225,000 to the County to fund a grant program for physical improvements and/or program developments or enhancements in Rodeo and/or Crockett. The substance and purpose of the Community Benefits Agreement will be to confirm the conditions under which the required payments will be made. In particular, Phillips 66 will make payments in the amounts specified below when the following events occur:

First Payment:

Phillips 66 shall pay $1,225,000 to Contra Costa County upon the County's final approval of this land use permit application (County File No. LP12-2073), or upon the Bay Area Air Quality Management District's final approval of the final Authority to Construct (air permit) for the Phillips 66 Propane Recovery Project at its Rodeo refinery, whichever occurs later. "Final approval" means that the County land use permit and the BAAQMD air permit have both been issued, the statute of limitations for challenging the issuance of each permit has run, and any pending legal challenges or appeals have been finally resolved.

Subsequent Payments:

When Phillips 66 begins recovering propane at its Rodeo refinery, Phillips 66 shall pay $500,000 to Contra Costa County no later than December 31 of the year in which propane is first recovered at its Rodeo refinery. After making the first $500,000 payment to the County, Phillips 66 shall pay $500,000 to Contra Costa County in each of the five following years in which Phillips 66 recovers propane at its Rodeo refinery. Each of these five payments shall be made no later than December 31 of the year in which propane was recovered.

As soon as is reasonably and expeditiously practicable, once the propane recovery portion of the Project is built, Phillips 66 will notify the County Department of Conservation and Development when each event that triggers a payment to the County occurs or if Phillips 66 has not recovered any propane in a calendar year. Upon reasonable advance notice to Phillips 66, the Department of Conservation and Development may audit relevant data and Phillips 66's records to verify the information it provides to the County, which Phillips 66 will provide to verify the occurrence associated with the relevant payment, subject to the parties' agreement regarding the protection of documents determined to include confidential, legally protected, business information.

All payments made by Phillips 66 under the Community Benefits Agreement will be deposited in a dedicated account for physical improvements and/or program developments or enhancements in Rodeo and/or Crockett, to be administered through a grant program administered by the Office of the District 5 Supervisor.

Supervisor Gioia

(not adopted)

PHILLIPS 66 CONDITION OF APPROVAL

REGARDING INHERENTLY SAFER SYSTEMS ANALYSIS

Construction of the project may commence only after the Contra Costa Health Services Hazardous Materials Programs Division staff reviews the Inherently Safer Systems Analysis (ISSA) report prepared by Phillips 66 and determines that the report conforms to applicable requirements set forth in the County's Industrial Safety Ordinance (County Ordinance Code, Chapter 450-8), as may be amended from time to time, including County Ordinance Code sections 450-8.016(i)(2) and 450-8.016(i)(3). Pursuant to County Ordinance Code section 450-8.016(i)(3), if any inherently safer system identified in the ISSA report is not recommended for implementation, the ISSA report must set forth sufficient evidence to demonstrate that implementation of the system is not feasible.

450-8.016(i)(1)(F) The stationary source shall conduct an ISSA (Inherently Safer Systems Analysis) during the design of new processes, process units and facilities. Immediately upon completion of the ISSA report referred to in subsection (i)(2) of this section, the stationary source shall advise the department of the availability of the ISSA report.

450-8016(i)(2) The stationary source shall prepare a written report documenting each ISSA within thirty days of completion of the ISSA and make the report available to the department during an audit or inspection and upon request. The ISSA report must contain, at a minimum, the following information:

(A) Identification and a description of the inherently safer system(s) analyzed in the ISSA;

(B) A description of the methodology used to analyze the inherently safer systems(s);

(C) The conclusions of the analysis;

(D) The rationale for the conclusions; and

(E) An action plan, including a timeline to implement the inherently safer system(s) recommended in the ISSA.

450-8.016(i)(3) The stationary source shall select and implement each inherently safer system identified in an ISSA report to the greatest extent feasible and as soon as administratively practicable. If a stationary source concludes that implementation of an inherently safer system is not feasible, the stationary source shall document the basis for this conclusion in meaningful detail. The documentation shall include sufficient evidence to demonstrate to the department's satisfaction that implementing the

inherently safer system is not feasible and the reasons for this conclusion. A claim that implementation of an inherently safer system is not feasible shall not be based solely on evidence of reduced profits or increased costs.

RCA Public Testimony
February 3, 2015 Board of Supervisors' Hearing
Phillips 66 Modification Project

We urge you to deny the Phillips 66 Modification Project. As you know, RCA has no interest in trying to shut down Phillips 66. We may not even oppose the current project. The problem though is that the EIR does such a dismal job of describing the Project and its environmental impacts, we really don't know what effect the Project will have on the environmental and our health and safety.

Our attorneys have submitted at least five letters on the EIR, including one that was submitted to the Board yesterday. I urge each supervisor to review these letters. They address the EIR's failure to examine Project impacts relating to air quality, greenhouse gas emissions, health risk, public safety risks and the Project's cumulative environmental effects. I'm not going to summarize those letters now.

Instead, I want to focus on what is, in my opinion, one of the most important issues: the EIR's failure to identify, analyze and mitigate the Project's impact on our community's safety.

My request is that, as I'm describing this issue, each of you please imagine that you live in our community.

The EIR concludes the Project would have **no impact** on our community from the presence and use of hazardous materials. Even worse, it states that it would have no impact on the Bayo Vista Child Development Center, a day care facility located less than one-quarter mile from the refinery; actually about 1000 feet away.

Let me read the EIR's "analysis" [redacted] of impacts on this day care center. Don't worry, it won't take long. The entire "analysis" consists of only nine sentences. As I'm reading this, please keep in mind CEQA's requirements that environmental impact analyses and EIR conclusions be supported by "**substantial evidence**." Here's what the EIR says:

> "The proposed Project would be entirely constructed and operated within the Refinery. There are **no** existing or proposed schools within one-quarter mile of the Project area. Therefore, the Project would not handle hazardous materials within one-quarter mile of an existing school. **No new impact.**
>
> Although not considered here as a school, a child care facility is within a quarter mile of the rail spur on which propane rail cars would be staged. The baseline risk includes butane rail cars

Janet Pygeorge
RCA

staged on that existing rail spur. The existing baseline risk would be calculated based on the potential release from an LPG-filled rail car. That basis is not changed by the proposed Project. If the child care facility were considered to be a school, there would be no change in risk, so the conclusion would remain that there would be no change and no new impact."

That's it; that's the entire analysis.

If your child or grandchild were enrolled at that school, would you now rest easy that the EIR had thoroughly evaluated the risk to those children .... of course not. Did the analysis include any evidence, let alone substantial evidence? Far from it.
So, would there really be **no increased risk** from this Project? **No.** There would absolutely be an increased risk. The project will add six new propane storage tanks. 4,200 barrels per day of propane will be stored, processed and shipped. An additional 3,800 barrels per day of butane will be stored, processed and shipped. A new railcar loading rack will be added to allow loading of propane. There are no existing Refinery facilities for loading and shipping propane. The number of railcars containing butane and propane will increase. With this increase in fuel stored on site, increased processing and increasing shipping, the likelihood of an accident is greatly increased. Also, with the increase in the sheer volume of fuels, any incident or explosion will be more severe.

We were curious how EIRs prepared for projects at other refinery's evaluate the risk of hazards to nearby residents. Do they provide the "substantial evidence and analysis" CEQA requires? What better place to look than to an EIR prepared for another Phillips 66 Project. Here's what the Santa Maria Refinery Rail Spur Project EIR's hazards analysis included:

- population density information for each sensitive location,
- the area over which the persons at these sensitive locations are distributed,
- the maximum number of persons that could be exposed to an accident or incident,
- the number of hours per day that persons are at these sensitive locations,
- an ignition probability (which defines the probability that a flammable cloud, for example, would reach the receptor and ignite and affect the receptor location).
- "risk profile" curves, one for fatalities and one for serious injuries for each location and for each type of accident scenario.

Compare that fairly comprehensive analysis to the Rodeo Phillip 66 EIR's analysis for the child care center, which can be boiled down to two key points: (1) the risk already exists and (2) there is no likelihood of a potential release from a rail car filled with propane and butane. Therefore there will be no impact.

That, members of the Board, is just one example of the problem with this EIR. It is entirely superficial. Analyses such as the one I just shared don't even pass the laugh test. Thank goodness CEQA is on our side. There is no indication the County is.

Janet Callaghan RCA

Board of Supervisors:

We all know the reason we are here is because this particular project has the potential to ruin the land and the life of people.

The revision to the environmental impact report discards the comments submitted as irrelevant to the project itself.

And yes, if the project would be conducted in an isolated area without interactions with the outside world it would probably be okay.

But the problem is it involves too many outside variables that the project can not control.

The approval of this project would have tremendous repercussions for the state of California, because this refinary alone is only one part of the puzzle and you know it.

The only ones that are benefiting if this project goes forward are Phillips 66 and its partners, the rest of the people are left to suffer the consequences of a wrong decision.

Please make a difference and set the example that Contra Costa County can not be bought by the big oil interest.

Thank you.

Carmen Gray
212 Sharon Ave
Rodeo, CA 94572

Pamela Peck
James Feroe
37 First Street
Rodeo, CA 94572

February 3, 2015

To: Board of Supervisors
Contra Costa County
30 Muir Road
Martinez, CA 94553

Re: Phillips 66 Propane Recovery Project REIR (file number LP12-2073)

Dear Supervisors,

As with the Draft EIR for this project, the REIR fails again to address serious impacts with dismissive statements in response to public as well as agency comments.

Public Safety:
The Rodeo Hercules Fire District Chief states in his comment letter (A4) included in the REIR, that the Fire District lacks permanent funding, and grant monies will only keep the Rodeo fire station open another year. This is considered an insignificant risk according to the REIR because "Phillips 66 provides its own emergency response for Refinery incidents" (A4-4). In the event of toxic emissions or a major earthquake resulting in fire and a propane tank explosion, there is no statement that Phillips 66 would be able to protect and evacuate all of the impacted residents of Rodeo, Crockett and Hercules. We are all aware that the potential for a major disaster exists, yet who will provide emergency support if the fire station is closed and the refinery workers are either dead or busy putting out the onsite fires.

Climate Change:
The County is charged with finding ways of reducing Green House Gases (GHGs) not perpetuating or increasing their production at the local level.
The REIR does not account for the downstream GHG emissions once the propane and butane are sold and burned at other locations, adding to the cumulative deterioration of the global climate. This project should also be linked to the P66 Santa Maria Refinery's proposed project and EIR process.

Local Property Values:
The REIR does not address the potential for the devaluation of local housing and businesses if this project is approved and built. Rodeo has suffered from increased noise and air pollution from the previously approved and built ConocoPhillips "Clean Fuels Project", with no compensation to local residents. Our property values are already dramatically lower than most Bay Area shoreline communities.
There is no mitigation plan to compensate local residents in the event of a serious refinery accident. The ConocoPhillips *2013 Annual Report, (Item 1A. RISK FACTORS)* states that "*We do not insure against all potential losses...*" Listed as potential hazards and risks are "*explosions, fires, crude oil spills, severe weather, geologic events, labor disputes, civil unrest or cyber attacks.*" If a catastrophic refinery event occurs, will Phillips 66 pay the price or just file bankruptcy.

Please do not continue to devalue our communities with additional, unnecessary risk. We ask that you do not approve this REIR or the "Propane Recovery Project."

Most Sincerely,

James K. Feroe

w/D.3

February 3, 2015

Contra Costa County Board of Supervisors
30 Muir Road
Martinez, CA 94553

Re: Phillips 66 Propane Recovery Project
Recirculated Draft Environmental Impact Report

Dear Supervisors:

I am a long time resident of Rodeo and afraid that the County is not (or ever was) concerned about the welfare of this community. I feel that the County is never on the side of this community and looks the other way when it comes to Phillips 66 Refinery. Why do we, as a community, have to fight the refinery and the County every time the refinery asks to make changes in their operations? All we want is to ensure that we are kept safe from pollution and hazards generated by this refinery. This refinery is rated the worst polluter in the US and the County does nothing to make them fix their record. You have the power, yet no one on the board of supervisors takes the time to listen to this disadvantaged community.

This RDEIR is still not complete. It still has flawed information or information that was purposely omitted.

For example:
The report states that there would not be any impact to a Child Day Care Center and a housing track that is less than one-quarter mile away from where rail cars are being loaded with hazardous materials. How can this be correct?

The number of railcars will increase substantially and therefore will increase the likelihood of an accident, which could cause death and destroy the environment for years. The air quality impacts will also be increased with more rail cars. All this has not been addressed correctly in the RDEIR.

This is just a small example of things that were flawed. Many other people or agencies will be addressing other problems with this report and I hope you take all concerns seriously.
I feel that P66 is purposefully hiding the truth from the County and the public.

Please stop them from endangering our lives with these lies and do the right thing. I ask you to require P66 to go over and beyond with safety requirements and not the bare minimum. I also request that the RDEIR be revised and recirculated to address the concerns of all the citizens from Rodeo, Crockett, and other communities that have commented about this flawed report. Your decision affects the whole Bay Area.

Thank you for your time,

Christine Coody
216 Third Street
Rodeo, CA 94572

Margaret C. Murray.

To the Board of Supervisors, February 3, 2015

I am a home owner in Pinole for fourteen years. I am very concerned about supporting and expanding tar sands oil and gas facilities, including transporting heavy crude oil and gas and their waste products, on the San Francisco Bay and the land surrounding it, especially the Richmond shoreline, Pinole, Crockett, Rodeo and Martinez because of the clear and obvious danger of contamination and health issues. I have a view of the bay from my house - a small partial view and sometimes watch the boats - big and small, going by. The thought of transporting, storing and replacing crude or fracked oil and all the volatile additives and petroleants. And to what end I ask myself? Oil is a dying industry that will be replaced. All of us know the global warming is occurring at a rate we cannot hope to diminish using lethal, dangerous and diversifying tar sands carbon products such as oil and its derivatives. We must instead invest in solar, wind and water power. So this Rodeo project is not only dangerous but irrelevant, expensive and unnecessary.

I have read of recent spills and explosions in the last weeks in Western Pennsylvania, 40 miles from Pittsburgh, my home as a child and in the Four Corners of the Southwest where they are destroying primative Native American structures, flamed in the atmosphere over the refineries and railroads and pipelines - Do we want explosions, fire, flames fires and contamination destroying our shoreline? Our highways, specifically I-80, and surrounding area, including the entire Sacramento Delta and San Francisco Bay? I cannot believe we do. Thank you.

Margaret C. Murray
9451 San Pablo Ave Pinole, CA 94564

2/3/2015
re: Item D3
In support of Appeal to reconsider Phillips 66 Project

John Gioia – page indicates that, among other things, you seek to improve air quality, smart growth and healthy planning.

Federal Glover – pages indicates you seek to make District 5 a more desirable place to live and keep our communities safe from many-made or natural threats.

These goals run counter to the proposed Phillips 66 project under consideration.

Like an advertisement, the RDEIR distorts facts and cleverly omits inconvenient realities. The refinery gave ~~useless answers to~~ the people and organizations ~~that raised concerns against the~~ project ~~by calling our concerns inconsequential~~. They spent a huge amount of money making their case, and got the last word, but that doesn't make them right.

Paraphrasing Robert F. Kennedy, Jr., ~~who I heard speak last year at the Goldman Awards~~, this is about Environmental Justice. Our natural resources are not owned by the government, and you have no right to give it away to others who would diminish it, which certainly this project will do – significantly so. Air, water, wildlife and the Bay cannot be reduced to private property; they belong to the public. They are the greatest assets of our community.

The refinery downplays the impact of the project and totally ignores the impact it already has on our community. And make no mistake, cumulatively the impact will be significant, which goes against the intent and purpose of CEQA, which was established to protect the environment. ~~They~~ pollute our skies with emissions and bright lights, our peace of mind with noise, including idling trains, our waters with heated liquid and God knows what else. ~~We have one of the best bird watching locales in the Bay Area. You think they're not impacted~~? Lately there have been scientific reports about the dire situation in the oceans and seas. We are seeing massive die offs of species. What's a little more dirty hot water going to hurt? It's all cumulative. ~~Oh, and they~~ think it's okay to offset their mess by buying carbon credits. It's just a mask. A dirty one, at that.

And then there are our safety concerns about explosive elements. The refinery downplays the risks. ~~Sure it's like playing the lottery – fat chance you'll win. But someone wins. Someone won a large ticket in Antioch recently.~~ It happens.

They can't keep expanding like it's nothing. It's something. Something big.

A word about Rodeo. We're a spunky bunch. We like our town. But it seems our neighbor to the East doesn't give a hoot about us. But you should. We are a voting, tax-paying public. We deserve better. I recently ran into a young friend who coincidentally moved to Rodeo. We will probably see more young people moving our way, with the migration out of expensive San Francisco and Berkeley. We should work to make Rodeo a more welcoming town, not a dirtier one.

Please live up to the way you present yourselves on your Board page.

Madalyn Morton
23 Garretson Ave
Rodeo, CA 94572

I would like to receive copy of the EIR for this land use permit.

Issue: Expansion of Phillips 66 Refinery Land Use Permit

I hope the county is requiring a comprehensive EIR prior to even considering allowing this refinery to expand. I am very concerned on what impact this could have to both health of local population & environment.

Sincerely
Maureen Warwick

CONTRA COSTA COUNTY
2015 FEB -2 P 3:17
DEPARTMENT OF CONSERVATION AND DEVELOPMENT

Maureen Warwick
130 Kathryn Dr.
Pleasant Hill, CA 94523-2920

Maureen Warwick
130 Kathryn Dr.
Pleasant Hill, CA 94523-2920

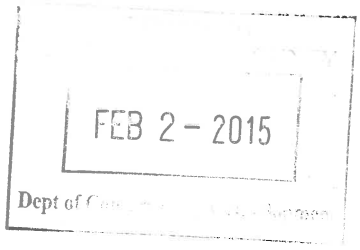
OAKLAND CA 945
30 JAN 2015 PM 6 L

CONTRA COSTA COUNTY
2015 FEB -2 P 1:33
DEPARTMENT OF CONSERVATION AND DEVELOPMENT

Contra Costa County
Conservation & Development
30 Muir Road
Martinez, CA 94553

Office

February 3, 2015



Contra Costa County Board of Supervisors
30 Muir Road
Martinez, CA 94553

Re: Phillips 66 Propane Recovery Project
Recirculated Draft Environmental Impact Report

Dear Supervisors:

I am a long time resident of Rodeo and afraid that the County is not (or ever was) concerned about the welfare of this community. I feel that the County is never on the side of this community and looks the other way when it comes to Phillips 66 Refinery. Why do we, as a community, have to fight the refinery and the County every time the refinery asks to make changes in their operations? All we want is to ensure that we are kept safe from pollution and hazards generated by this refinery. This refinery is rated the worst polluter in the US and the County does nothing to make them fix their record. You have the power, yet no one on the board of supervisors takes the time to listen to this disadvantaged community.

This RDEIR is still not complete. It still has flawed information or information that was purposely omitted.

For example:
The report states that there would not be any impact to a Child Day Care Center and a housing track that is less than one-quarter mile away from where rail cars are being loaded with hazardous materials. How can this be correct?

The number of railcars will increase substantially and therefore will increase the likelihood of an accident, which could cause death and destroy the environment for years. The air quality impacts will also be increased with more rail cars. All this has not been addressed correctly in the RDEIR.

This is just a small example of things that were flawed. Many other people or agencies will be addressing other problems with this report and I hope you take all concerns seriously.
I feel that P66 is purposefully hiding the truth from the County and the public.

Please stop them from endangering our lives with these lies and do the right thing. I ask you to require P66 to go over and beyond with safety requirements and not the bare minimum. I also request that the RDEIR be revised and recirculated to address the concerns of all the citizens from Rodeo, Crockett, and other communities that have commented about this flawed report. Your decision affects the whole Bay Area.

Thank you for your time,

Christine Coody
216 Third Street
Rodeo, CA 94572

district5@bos.cccounty.us
supervisormitchoff@bos.cccounty.us
supervisorandersen@bos.cccounty.us
mary.piepho@bos.cccounty.us
john_gioia@bos.cccounty.us

FEB 2 - 2015
Dept of Conservation & Development

From: Charles Davidson <charlesdavidson@me.com>

Subject: PHILLIPS 66 Propane Recovery Project EIR

Greetings Supervisors,

Please read my submitted brief critique of the Phillips 66 EIRs for the "piece-mealed" and combined Rodeo and Santa Maria combined Tar Sands project. Piece-mealing these two proposed projects as if they are distinctly separate projects, but that in reality are one larger project, is expressly not allowed under CEQA guidelines.

The short comment below that I have authored is based upon my reading of the recirculated draft EIRs for both the Phillips 66 Rodeo Refinery's Propane Recovery Project and the Santa Maria Refinery's interrelated Rail Spur Expansion Project and Throughput expansion Projects.

The short comment letter, with slight variation, was sent to both (the Contra Costa and San Lois Obispo) County Planning Commissions and was also based on the detailed analysis of both Greg Karras (of Communities for a Better Environment) and Dr. Phyllis Fox (of Shute, Maheliy and Weinberg).

I tried to make my 2-page letter as short and non-technical as possible.

I hope that the comment letter is a valuable read for you. The analysis was made easier in the Santa Maria recirculated draft EIR compared to the draft EIR, because Phillips 66 finally stated outright that the crude by rail would absolutely not be the highly volatile Bakken North Dakota light shale oil, leaving Canadian Tar Sands bitumen (extra heavy crude) as the only possibility.

Tar Sands and Bakken crude are both land-locked and can only get to CA by rail or barge from up north, but the key Phillips 66 project in Santa Maria is a rail expansion project.

The reason that Canadian Tar Sands ends up in Rodeo, is that CA crude from down south would definitely *not* arrive in 100 car trains and the crude that is pre-processed in

Gary Kupp

From: Roger Lin <roger@cbecal.org>
Sent: Monday, February 02, 2015 4:27 PM
To: Tiffany Lennear
Cc: Lashun Cross; Gary Kupp; GREG KARRAS
Subject: CBE Appeal Filed 12/2/13 LP12-2073, additional evidence for hearing tomorrow
Attachments: Karras Rodeo Rpt-3 (LP12-2073).pdf

To the Clerk of the Board,

Please find the attached comment from CBE supporting our appeal on the above matter, scheduling for a hearing tomorrow morning at the Board of Supervisors.

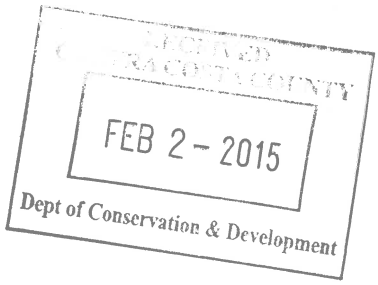
Please confirm receipt of this document by return email.

Many thanks,

Roger Lin
Staff Attorney
Communities for a Better Environment
1904 Franklin Street, Suite 600
Oakland, CA 94612
(510) 302-0430 ext. 16

The information contained herein is confidential and may be privileged as an attorney-client communication. It is intended only for the individual or entity to whom it is addressed. If you are not the intended recipient, you are hereby notified that any use of this communication is strictly prohibited.

Expert Report of Greg Karras
Communities for a Better Environment (CBE)
2 February 2015



Regarding the

Phillips 66 Company Propane Recovery Project
Recirculated Final Environmental Impact Report (RFEIR)
Released in January 2015 by the Contra Costa County
Department of Conservation and Development
State Clearinghouse #2012072046
County File #LP12-2073

I, Greg Karras, declare and say:

1. I reside in unincorporated Marin County and am employed as a Senior Scientist for Communities for a Better Environment (CBE). My duties for CBE include technical research, analysis, and review of information regarding industrial health and safety investigation, pollution prevention engineering, pollutant releases into the environment, and potential effects of environmental pollutant accumulation and exposure. My qualifications, curriculum vitae, and publications list were provided with my previous reports on the project and its draft and recirculated draft Environmental Impact Report (DEIR, and RDEIR, respectively).[1]

2. I have reviewed the Phillips 66 Company 'Propane Recovery Project' (project) Recirculated Final Environmental Impact Report (RFEIR) and reassert my previous comments as they remain valid and have not been addressed in the RFEIR. In its attempt to rationalize its decision not to analyze or even disclose the changes in oil feedstock that will be necessary to implement the project, and despite the potential pollution and hazard impacts from those feedstock changes, the RFEIR repeats the unsupported assertion that sufficient propane and butane (LPG) is recoverable in the project baseline. The RFEIR does not include any publicly verifiable data supporting this assertion, or consider evidence provided by the public indicating that a change in the refinery's oil feedstock

[1] *See* esp. my reports dated 4 September 2013 report (Karras Rodeo Report-1) and 5 December 2014 (Karras Rodeo Report-2). *See* also my 7 January 2014 Supplemental Evidence–B (CBE Supp-B), 14 January 2014 Supp. Evidence–C (CBE Supp-C), 20 January 2014 Supp. Evidence–D (CBE Supp-D; co-authored with Roger Lin), and 24 November 2014 report regarding the 'Rail Spur Extension and Crude Unloading Project' (Karras Rail Spur Report). Each of these documents and its attachments was provided to Contra Costa County and is incorporated herein.

will be necessary to provide enough LPG for the proposed project.[2] However, the RFEIR does more specifically delimit the *type* of measurements it purports to rely upon for its LPG baseline estimate. My review of the project and RFEIR reported herein focuses on the adequacy of its project description and analysis of potential environmental impacts with respect to this new information on the type of measurements that the RFEIR relies upon for that baseline analysis. My opinions on these matters and the basis for these opinions are stated in this report.

3. According to the RFEIR, the type of data it used to estimate LPG recoverable in the project baseline was limited to project design data. It relies on measurements during August 2011 that Phillips 66 used as the project "design basis" for its conclusion that "the existing Refinery baseline condition had and has sufficient propane and butane feedstocks to support the extraction rates of propane and butane sought by Phillips 66 for the proposed Project." (RFEIR at 2-3, 2-5, 2-6.) The RFEIR mentions other data, but in response to CBE's previous comment that the RDEIR was wrong to include those 2013 data in the baseline and the refinery had already begun to change its feedstock by then (RFEIR at 3.2-77), the RFEIR confirms this reliance on the 2011 design basis data:

> "[T]he actual sampling and measurements of propane and butane in the refinery fuel gas (RFG) at the Refinery that was used as the basis for the design and permit limit of 14,500 barrels per day (BPD) occurred in 2011, not 2013 as the commenter appears to suggest. The sampling data for year 2013 is presented in the RDEIR for informational purposes and does not represent the baseline for the proposed Project … ." (RFEIR at 3.2-128; RTC B9-25; emphasis added.)

4. 'Design basis' means the conditions that are taken into account when designing a facility or product.[3] Those include anticipated post-project conditions. 'Project baseline' means existing conditions, not post-project conditions. Equating data representing design basis conditions with those representing current baseline conditions is a logical fallacy, but the RFEIR does exactly that. This is a clear error in its project description.

---

[2] *See* Karras Rodeo Report-1; CBE Supp-C; CBE Supp-D; Karras Rodeo Report-2; Karras Rail Spur Report; and the comments and reports of Drs. Fox and Pless in this matter.

[3] *See* Black's Law Dictionary (http://thelawdictionary.org/design-basis/#ixzz3QRYQrkhw).

5. Future conditions that are taken into account when designing facilities to make refined products include, among others, potential post-construction changes in operation, production, and environmental health and safety due to changes in facility oil feedstock.[4]

6. The refinery's oil feedstock will almost certainly change during the proposed project's operating term. This is shown by processing data, dwindling current crude supplies, the company's plans to replace them with 'advantaged crudes' that include diluent/bitumen ('dilbit') blends from Canada and shale oils from the Bakken region, and its current wharf and throughput expansion and rail spur proposals that would enable those plans.[5] Indeed, while it errs in disputing the relevance of this change in feedstock, the RFEIR does not dispute the *potential* for this oil switch.

7. Phillips 66 has a strong incentive to design its project based on measurements taken when it was processing samples of feedstock blends similar to those it could process during the project's operating life. Not to do so would risk capital on a potentially underproductive or stranded asset. For example, LPG yields from delayed coking—a major producer of LPG in this refinery—vary greatly when coker feedstock is derived from different crude oils.[6] Even when detailed composition data are available for each oil in a new feedstock blend, predictions about the behavior of the *blend* during actual conversion processing remain limited and uncertain until the complex interactions of blend-specific components are tested directly in practice.[7]

8. The volume and country of origin of each oil shipment imported and processed by each refinery in the U.S. each month, as well as the density and sulfur content of each such shipment that is crude oil, is reported publicly by the U.S. Energy Information Administration (EIA). These EIA data for the period from 1 January 2006 through 30 November 2014 are appended hereto as Attachment K3-1.

9. During the five months through August 2011, when the RFEIR states that Phillips 66 took the measurements of the refinery that were used as the design basis for the

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[4] *See* Meyers, 1986; Speight, 1991; Karras, 2010; Bredeson et al., 2010; UCS, 2011; Abella and Bergerson, 2012; Brandt, 2012; API, 2009; CSB, 2013 *in* Karras Rodeo Report-1 attachments.
[5] CBE and others provided abundant evidence for each of these points: *see* Karras Rodeo Report-1; Karras Rodeo Report-2; Karras Rail Spur Report, and the comments of Drs. Fox and Pless.
[6] *See* Meyers, 1986 *in* Karras Rodeo Report-1 and attachments thereto. *See* esp. Karras Rodeo Report-1 at Table 2, page 7 and Meyers tables 7.1-2 and 7.1-6.
[7] Speight, 1991 at 301-305 *in* Karras Rodeo Report-1 attachments.

project (April–August), the refinery received ≈ 1.5 million barrels of 40.1 °API gravity, 0.61 wt. % sulfur crude oil from Russia for processing in four consecutive shipments. (Att. K3-1.) The refinery did not normally run this particular crude oil. This 1.5 million barrels from April–August 2011 represents only the second time the refinery received this particular crude for processing,[8] the largest volume of that crude it ever processed in a year, and the lowest average API gravity (lightest) foreign crude imports it received in any five-months, during 2006 through November 2014. (*Id.*)

10. A report by Sandu and Wright entitled 'Innovative Solutions for Processing Shale Oils' that was published in *Hydrocarbon Processing* during 2013 is appended hereto as Attachment K3-2, and EIA's May 2014 report entitled *U.S. Crude Oil Production Forecast–Analysis of Crude Types* is appended hereto as Attachments K3-3. These reports suggest Bakken crude oil averages ≈ 0.3 wt. % sulfur and 40.8 °API (Att. K3-2) with the density of most Bakken crude oils ranging from ≈ 40–45 °API (Att. K3-3). The 40.8 °API and 0.3 wt. % sulfur averages for Bakken compare to the density (40.1 °API) and sulfur content (0.6 wt. %) of the Russian crude received by Phillips' San Francisco Refinery while it was collecting the measurements it used as the design basis for the project. In terms of these bulk properties, the Russian crude processed by the refinery could be called a 'Bakken look-alike' crude.

11. Bay Area Air Quality Management District (BAAQMD) Application No. 25608 by Phillips 66, dated 31 July 2013, for 'Phase III' of its proposed expansion of wharf capacity to replace dwindling San Joaquin Valley Pipeline (SJVP) crude deliveries to the refinery with waterborne oils from different sources is appended hereto as Attachment K3-4. A chart in this application indicates that the monthly average sulfur content of the refinery crude slate during normal operation from 2004–August 2011 ranged from ≈ 1.8–2.7 wt. %. (Att. K3-4.) The 1.5 million barrels of 0.6 wt. % sulfur crude that the refinery imported from Russia when it was taking the measurements for its project design basis was substantially lower in sulfur than its current crude slate as reported by Phillips 66. At 40.1 °API, this import crude also was substantially lighter than the average density of the refinery's crude slate (≈ 23 °API) estimated during 2008 by previously work.[9] Lighter crude oils, such as this 40.1 °API imported crude and Bakken crude, can be

[8] The only other time during 2006–Nov 2014 was when the San Francisco Refinery received two shipments of Russian crude with these properties in June and July 2010 (Att. K3-1), possibly for a pre-test or previous test run, in the same season a year earlier.

[9] *See* Karras Rodeo Report-1 at 8 (average density in 2008 ≈ 915–918 kg/m^3).

expected to yield substantially more LPG per barrel from distillation, on average, than heavy crude oils, such as those processed at the refinery in the project baseline.

12. Data reported by the industry for dilbit crude streams that are produced in Canada and available for U.S. import are appended hereto as Attachment K3-5. For whole crude, the most recent five-year average densities and sulfur contents reported for these Canadian dilbits ranged from 923–929 kg/m^3 (21.8–20.8 °API) and from 3.5–3.9 wt. %, respectively. (Att. K3-5.) Individual shipments of these dilbits could be expected to range somewhat more widely than these five-year averages.

13. During 2011, the refinery received for processing 153,000 barrels of Canadian crude with a density *and* sulfur content similar to those reported for the Canadian dilbits or denser diluent/bitumen blends (< 24 °API *and* ≥ 2.5 wt. % sulfur). (Att. K3-1.) This 2011 shipment represents a much larger volume of Canadian crude with that range of density and sulfur than the refinery reported receiving and processing in any shipment or any year during January 2006 through November 2014, the first shipment of such crude the refinery reported processing since at least 2005, and the only time since then when the refinery reported processing that crude in this period until 2013. (*Id.*) The only other year since at least 2005 when the refinery received dilbit for processing was 2013 (*Id.*), when, the RFEIR states, Phillips took additional measurements to confirm its project design.

14. Refinery distillation of LPG-rich diluent and cracking of bitumen contained in dilbits can result in LPG yields substantially greater than those from processing the refinery's current baseline crude slate.[10]

15. The refinery has multiple oil storage tanks among which it transfers oils before processing them.[11] Like other refiners, Phillips 66 uses this interconnected storage capacity to advance its processing and business objectives by storing the oils it has received and controlling the timing and amount of each oil it blends into the total feedstock stream processed at the refinery. Thus, the company could have stored the crude it imported from Russia during April–August 2011 for processing in August, when the RFEIR states that the company took the measurements supporting its design basis for the project. Moreover, like other oil companies, Phillips 66 could be expected to measure

[10] *See* my previous comments and expert reports and those of Drs. Fox and Pless.
[11] *See* Attachment K3-4; *see* also BAAQMD 2013 *in* Karras Rodeo Report-1 attachments.

many 'test' oil blends before committing to a major capital project such as this project.[12] In fact, not to do so could risk an unproductive capital investment due to complex and unpredictable interactions of constituents in the new oil blends during future processing, and, from a process design or business perspective, might be considered irresponsible. However, such tests of new oil feedstock blends that appear necessary to establish a valid design basis for the project do not, by definition, represent the typical current baseline feedstock processing conditions.

16. The County could have chosen to estimate the amounts of propane and butane that are recoverable during typical current (2010–2012) conditions based on valid, publicly reported, independently verifiable data. Had it chosen to do so, the County could have required that Phillips 66:

- report each discrete process stream from which LPG would be recovered;
- demonstrate the amounts of LPG it is feasible to recover from each such stream;
- report each discrete measurement of oil feedstock, fuel gas production, and LPG stream quality and quantity in the baseline, including date and time of sampling;
- demonstrate that measurements taken when oil feedstock, processing, or both deviated from typical current baseline conditions (such as in tests done to design the project) are not lumped in with and will not skew the baseline sample data;
- compare the resultant validated baseline data with the proposed project design basis data to support its analysis of potential project impacts, and
- report the supporting data for that comparison and analysis in the EIR.

Unfortunately, the County has not done so, and its the RFEIR has not included, or otherwise provided the public access to, any of these data.

17. Excerpts from a 2014 CEQA review by the City of Richmond for the Chevron Richmond Refinery 'Modernization' Project are appended hereto as Attachment K3-6. The City's EIR for that project included data for baseline as well as anticipated post-project crude and gas oil feedstock density, sulfur content, distillation properties, and feedstock processing rates for processes in the Richmond refinery. (Att. K3-6.) Further, the City of Richmond's CEQA process provided for public access to detailed data, including but not limited to sample analysis results for discrete measurements of various toxic metals in the crude feedstock blends processed by the Richmond refinery as well as the gas oil streams processed by Richmond refinery conversion processing units. (*Id.*)

[12] Those test samples may have included domestically produced Bakken and bitumen, which would not be reported by EIA as foreign imports.

This evidence suggests that the County could choose to include the data necessary to support independently verifiable analysis of project changes in oil feedstock quality, oil feedstock quantity, and process rates, in the EIR for this Phillips 66 project.

18. An 'Incomplete Letter' issued on 22 August 2014 by the Bay Area Air Quality Management District (BAAQMD) to Phillips 66 regarding its 'Phase III' wharf expansion proposal is appended hereto as Attachment K3-7. Among other outstanding questions regarding Phillips' proposal, BAAQMD found that its application to replace additional current SJVP crude supplies to the refinery with waterborne crude oils from different sources was incomplete because "detailed crude oil information pre and post project" is needed. (Att. K3-7.) This evidence further suggests that the County could choose to include baseline and anticipated post-project oil feedstock quality data in the EIR.

19. In my opinion: Phillips 66 has both motive and opportunity to measure samples of the new oil feedstock the company plans to, proposes to, and is investing capital to process at the refinery while the proposed project would be operational. The conclusion in the RFEIR that this 'design basis' data represents current baseline conditions is illogical and its failure to disclose or analyze the baseline, post-project, and design basis feedstock data renders its illogical conclusion unsupported by any evidence. These clear errors in the RFEIR's project description ignore the reasonable potential, documented in previous comments, that significant feedstock-driven impacts on environmental health, safety, and climate protection could result from the project.

20. I have given my opinions on these matters based on my knowledge, experience and expertise and the data, information and analysis discussed in this report.

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I declare under penalty of perjury that the foregoing is true of my own knowledge, except as to those matters stated on information and belief, and as to those matters, I believe them to be true.

Executed this **_2nd_** day of February 2015 at Oakland, California

Greg Karras

Gary Kupp

From: Charissa L. Villanueva <cvillanueva@adamsbroadwell.com>
Sent: Monday, February 02, 2015 4:40 PM
To: Lashun Cross
Cc: Gary Kupp; Rachael E. Koss
Subject: Commetns on the RFEIR for the Phillips 66 Propane Recovery Project (SCH No. 2012072046)
Attachments: 3105-016cv - Comments on Propane Recovery RFEIR.pdf; Attachment A.pdf; Attachment B.pdf

Attached are our comments in PDF format the **RFEIR for the Phillips 66 Propane Recovery Project**. If you have any trouble opening any of the attachments, please contact Charissa Villanueva at the phone number or email listed below. If you have any questions regarding the comments, please feel free to contact Ms. Koss directly.

Thank you.

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CONTRA COSTA COUNTY
FEB 2 - 2015
Dept of Conservation & Development

February 2, 2015

By Email and Overnight Mail

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Re: Comments on the Recirculated Final Environmental Impact Report for the Phillips 66 Propane Recovery Project (SCH No. 2012072046)

Dear Ms. Cross:

We are writing on behalf of Safe Fuel and Energy Resources California ("SAFER California") to comment on the Phillips 66 Propane Recovery Project ("Project") Recirculated Final Environmental Impact Report ("RFEIR"), prepared by Contra Costa County pursuant to the California Environmental Quality Act ("CEQA").[1] Phillips 66 proposes to recover 14,500 barrels per day of propane and butane from refinery fuel gas at its Rodeo Refinery and to export (by rail) the propane and butane for sale. This would require modifying existing equipment and adding new equipment, including a hydrotreater, fractionation columns, a steam boiler, six propane storage vessels, a loading rack and two rail spurs.

We have reviewed the RFEIR. The RFEIR includes a few minor changes purportedly to address the shortcomings that we identified in our December 5, 2014 comment letter on the RDEIR (which we incorporate herein by reference). Despite these minor changes, numerous significant impacts from the Project remain inadequately evaluated and mitigated. Further, the RFEIR fails to meaningful respond to the issues raised in our comments on the RDEIR. As a result, the RFEIR does not comply with the requirements of CEQA and may not be used in approving the Project. Like the RDEIR, the RFEIR fails to: (1) describe and analyze

[1] Pub. Resources Code, §§ 21000 et seq.

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the whole Project; (2) provide a sufficiently detailed environmental setting to enable an adequate analysis of significant impacts on air quality, public health and safety and from greenhouse gas emissions; and (3) identify and reduce the Project's potentially significant air quality, public health and safety and hazards impacts, as well the Project's significant climate change impacts. These defects render the RFEIR inadequate as an informational document. The County must withdraw the RFEIR and prepare a revised EIR which fully complies with CEQA.

I. INTEREST OF COMMENTORS

SAFER California advocates for safe processes at California refineries to protect the health, safety, standard of life and economic interests of its members. For this reason, SAFER California has a strong interest in enforcing environmental laws, such as CEQA, which require the disclosure of potential environmental impacts of, and ensure safe operations and processes for, California oil refineries. Failure to adequately address the environmental impacts of crude oil and other refinery product transport and refining processes poses a substantial threat to the environment, worker health, surrounding communities and the local economy.

Refineries are uniquely dangerous and capable of generating significant fires and the emission of hazardous and toxic substances that adversely impact air quality, water quality, biological resources and public health and safety. These risks were recognized by the Legislature and Governor when enacting SB 54 (Hancock). Absent adequate disclosure and mitigation of hazardous materials and processes, refinery workers and surrounding communities may be subject to chronic health problems and the risk of bodily injury and death. Additionally, rail transport of crude oil and other refinery products has been involved in major explosions, causing vast economic damage, significant emissions of air contaminants and carcinogens and, in some cases, severe injuries and fatalities.

Poorly planned refinery projects also adversely impact the economic wellbeing of people who perform construction and maintenance work in the refinery and the surrounding communities. Plant shutdowns in the event of accidental release and infrastructure breakdown have caused prolonged work stoppages. Such nuisance conditions and catastrophic events impact local communities and can jeopardize future jobs by making it more difficult and more expensive for businesses to locate and people to live in the area. The participants in SAFER California are also concerned about projects that carry serious environmental risks and public

service infrastructure demands without providing countervailing employment and economic benefits to local workers and communities.

The members represented by the participants in SAFER California live, work, recreate and raise their families in Contra Costa County, including the town of Rodeo. Accordingly, these people would be directly affected by the Project's adverse environmental impacts. The members of SAFER California's participating unions may also work on the Project itself. They will, therefore, be first in line to be exposed to any hazardous materials, air contaminants, and other health and safety hazards, that exist onsite.

II. THE COUNTY FAILED TO INCLUDE OR ADEQUATELY DESCRIBE RELEVANT INFORMATION AND UNDERLYING TECHNICAL DATA IN THE RFEIR AND DISCLOSE IT TO THE PUBLIC

CEQA requires the underlying technical data necessary to fully assess the Project's environmental impacts, which were referenced and relied on in the RFEIR, to be included in the RFEIR and the County's failure to do so precluded informed participation by the public.[2] Moreover, the RFEIR failed to describe the withheld documents in sufficient detail to adequately inform the public (or decisionmakers), as required by CEQA.[3]

CEQA requires that an EIR include technical data and similar relevant information to permit the full assessment of significant environmental impacts by reviewing agencies and members of the public.[4] An EIR cannot rely on information that is neither included in the document nor adequately described therein.[5] Further, CEQA requires that "all documents referenced in the environmental impact report" be available for review and "readily accessible" to the public.[6] The

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[2] Pub. Resources Code § 21092(b)(1); CEQA Guidelines §§ 15087(c)(5), 15147; *Madera Oversight Coalition, Inc.*, 199 Cal.App.4th at 76-77.

[3] *Vineyard Area Citizens for Responsible Growth,* 40 Cal.4th at 442; *Santa Monica Baykeeper v. City of Malibu* (2011) 193 Cal.App.4th 1538, 1547 ("[a]n EIR must include detail sufficient to enable those who did not participate in its preparation to understand and consider meaningfully the issues raised by the Proposed Project"); *San Franciscans for Reasonable Growth,* 193 Cal.App.3d at 1549 (noting an EIR must include underlying technical detail so readers can evaluate its conclusions).

[4] CEQA Guidelines § 15147; *San Franciscans for Reasonable Growth v. City and County of San Francisco* (1987) 193 Cal.App.3d 1544, 1549 (noting an EIR must include underlying technical detail so readers can evaluate its conclusions).

[5] *Vineyard Area Citizens for Responsible Growth,* 40 Cal.4th at 442.

[6] Pub. Resources Code § 21092(b)(1); CEQA Guidelines § 15087(c)(5).

courts have held that the failure to provide even a few pages of a CEQA document for a portion of the CEQA review period invalidates the entire CEQA process.[7] A prejudicial abuse of discretion occurs "if the failure to include relevant information precludes informed decisionmaking and informed public participation, thereby thwarting the statutory goals of the EIR process."[8]

In the RDEIR and RFEIR, the County referenced and relied on technical data and materials to conclude that the Project would not result in significant air quality and public health impacts. However, the County did not include or adequately describe in the RDEIR or RFEIR the technical data and materials. Further, when SAFER California and others requested that the County provide the materials during the comment period on the RDEIR, the County refused.[9] Therefore, SAFER California and other members of the public were significantly prejudiced from the inability to verify the basis for the County's conclusions regarding very real air quality and public health impacts. The County's failure to include relevant information and underlying technical data in the RFEIR and withhold the documents from public review violates CEQA.

III. THE RFEIR FAILS TO ADEQUATELY RESPOND TO COMMENTS

"The evaluation and response to public comments is an essential part of the CEQA process. Failure to comply with the requirement can lead to disapproval of a project."[10] The written responses must describe the disposition of the significant environmental issues raised on the comments.[11] The lead agency must specifically explain its reasons for rejecting suggestions received in comments and for proceeding with the project despite its environmental impacts. "There must be a good faith, reasoned analysis in response. Conclusory statements unsupported by factual information will not suffice."[12] "The requirement of a detailed analysis in

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[7] *Ultramar v. South Coast Air Quality Man. Dist.* (1993) 17 Cal.App.4th 689.

[8] *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 722; *Galante Vineyards v. Monterey Peninsula Water Management Dist.* (1997) 60 Cal.App.4th 1109, 1117; *County of Amador v. El Dorado County Water Agency* (1999) 76 Cal.App.4th 931, 946.

[9] See **Attachment A**: Letter from Rachael Koss to John Kopchik, Tiffany Lennear and Lashun Cross re Follow-up Request for Extension of the Comment Deadline for Phillips 66 Propane Recovery Project Recirculated Draft EIR, December 3, 2014.

[10] *See* discussion following CEQA Guidelines § 15088.

[11] Pub. Resources Code § 21091(d)(2)(B); CEQA Guidelines § 15088(c).

[12] CEQA Guidelines § 15088(c).

response [to comments] ensures that stubborn problems or serious criticism are not swept under the rug."[13]

Here, the County failed to provide a good faith, reasoned analysis in response to numerous public comments. In most instances, the responses to comments consist of general statements that the RFEIR adequately addressed the issues raised by commentors. In other instances, the responses completely missed the mark and failed to address the particular issues raised in comments. The attached comments from environmental engineer, Phyllis Fox, Ph.D., PE and air quality expert Petra Pless, D.Env. describe in detail the County's failure to respond their technical comments on the RDEIR.[14]

IV. THE RFEIR FAILS TO DESCRIBE AND ANALYZE THE WHOLE PROJECT, FAILS TO ADEQUATELY DESCRIBE THE ENVIRONMENTAL SETTING AND FAILS TO IDENTIFY AND REDUCE THE PROJECT'S SIGNFICANT AIR QUALITY, PUBLIC HEALTH, GREENHOUSE GAS EMISSIONS AND HAZARDS IMPACTS

The RFEIR does not comply with CEQA. The RFEIR fails to adequately describe and analyze the Project, fails to accurately and adequately describe baseline conditions against which to measure the Project's air quality and public health impacts and fails to identify, disclose and mitigate the Project's significant air quality, public health, greenhouse gas emissions and hazards impacts. Below is a list of these fatal flaws. Dr. Fox's and Ms. Pless' attached comments provide detailed comments regarding the RFEIR's errors. We incorporate by reference Dr. Fox's and Ms. Pless' comments.

The RFEIR is inadequate because it:

- Fails to adequately describe the crude slate required to recover the proposed 14,500 bbl/day of protane/butane;
- Piecemeals the Project;
- Inflates the baseline for, and underestimates, the Project's NOx emissions from locomotives;

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[13] *Santa Clarita Organization for Planning the Environment v. County of Los Angeles* (2nd Dist. 2003) 106 Cal.App.4th 715, 732.

[14] **Attachment B**: Phyllis Fox and Petra Pless, Comments on Recirculated Final Environmental Impact Report for the Phillips 66 Propane Recovery Project, February 2, 2015.

- Underestimates the Project's NOx emissions by using invalid NOx emissions reductions for Heater B-401;
- Fails to identify the Project's increased NOx emissions from the Sulfur Recovery Unit and the Hydrogen Plant;
- Fails to identify the Project's significant air quality impacts from NOx emissions;
- Fails to identify the Project's significant greenhouse gas emissions impacts;
- Fails to identify the Project's significant health risk impacts from operational emissions; and
- Fails to identify the Project's significant cumulative air quality, public health, greenhouse gas emissions and hazards impacts.

With respect to cumulative impacts, the County makes several legal arguments which cannot be reconciled with CEQA. First, the County argues that the Project will not result in cumulative air quality impacts because "BAAQMD CEQA guidance states that if a project's emissions are less than the CEQA significance thresholds, they would have a less than significant contribution to cumulative impacts."[15] The County's reliance on BAAQMD guidance here is incorrect. Under CEQA, a project may result in significant air quality and public health impacts even if a project's emissions do not exceed an air district guidance's thresholds.[16]

Second, the County argues that its cumulative impact assessments for the Project need not include projects at the Santa Maria Refinery because the Santa Maria Refinery is 200 miles from the Project. This, too, is incorrect. A legally adequate cumulative impact analysis views a particular project in conjunction with other related past, present, and reasonably foreseeable future projects *whose impacts might compound or interrelate with those of the project at hand.*[17] The key question in determining what projects should be included in a cumulative impact analysis "is whether it was reasonable and practical to include the projects and whether, without their inclusion, the severity and significance of the cumulative impacts were reflected adequately."[18] Here, there is substantial evidence showing

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[15] RFEIR, p. 3.2-251.
[16] *Kings County Farm Bureau v. City of Hanford* (1990) 221 Cal.App.3d 692, 716-717 ("The point is that the fact that on-site emissions alone and secondary emissions alone do not exceed KCAPCD's offset levels cannot properly be used to invoke the presumption that the project will have no significant impact on air quality.").
[17] 14 Cal. Code Regs. §§ 15130, 15355.
[18] *Kings County Farm Bureau*, 221 Cal.App.3d at 723.

that the Santa Maria Refinery projects (which are connected to the Rodeo Refinery by a pipeline and which operate with the Rodeo Refinery as one refinery) must be included in the Project's cumulative impacts analyses because it is reasonable and practical to do so and not including them would diminish the "severity and significance of the cumulative impacts."[19]

Finally, the County seems to fundamentally misunderstand the legal standard for analyzing the Project's cumulative impacts. The County argues that it need not include projects involving rail traffic in its cumulative impacts analyses because the Project "utilizes the same train trips by adding tank cars to existing trains and would not increase the total number of train trips."[20] Once again, the County has it all wrong – an increase of train trips is not the trigger for conducting a cumulative impact analysis. Rather, it is the Project's incremental contribution to a larger effect which triggers a cumulative impact analysis. "Cumulative impacts can result from individually minor but collectively significant projects taking place over time."[21] A project has a significant cumulative effect if it has an impact that is individually limited but "cumulatively considerable."[22] "Cumulatively considerable" is defined as "the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects."[23] Cumulative impact analyses are necessary because "environmental damage often occurs incrementally from a variety of small sources [that] appear insignificant when considered individually, but assume threatening dimensions when considered collectively with other sources with which they interact."[24]

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[19] *Id.*
[20] RFEIR, p. 2-15.
[21] 14 Cal. Code Regs. § 15355(b).
[22] *Id.* § 15065(a)(3), 15130(a).
[23] *Id.* §15065(a)(3).
[24] *Communities for a Better Env't v. Cal. Res. Agency* (2002) 103 Cal.App.4th 98, 114.

V. CONCLUSION

We thank the County for this opportunity to comment on the RFEIR. We urge the County not to certify the RFEIR and to prepare and circulate a revised EIR which adequately responds to comments, describes and analyzes the whole Project, identifies the Project's potentially significant impacts, and requires Phillips 66 to incorporate all feasible mitigation measures into the Project to reduce impacts to a less than significant level.

Sincerely,

Rachael E. Koss

REK:clv

Attachments

CC: *(Via Email only)*
Gary Kupp, Planner
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ATTACHMENT A

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December 3, 2014

Via Email and U.S. Mail

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Lashun Cross, Principal Planner, lashun.cross@dcd.ccounty.us

Re: Follow-up to Request for Extension of the Comment Deadline for Phillips 66 Propane Recovery Project Recirculated Draft Environmental Impact Report (County File #LP12-2073 and SCH #2012072046)

Dear Mr. Kopchik, Ms. Lennear and Ms. Cross:

We are writing on behalf of Safe Fuel and Energy Resources California ("SAFER California") to follow up on our request for an extension of the December 5, 2014 comment deadline for the Recirculated Draft Environmental Impact Report ("RDEIR") prepared for the Phillips 66 Propane Recovery Project. As we explained in our December 1, 2014 letter, the California Environmental Quality Act ("CEQA") requires that all documents referenced or relied upon in an environmental review

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document be made available to the public for the entire comment period.[1] Once materials are properly made available, CEQA requires a minimum of 45 days for public review and comment.[2]

Our letter listed several documents which were not provided to us in response to our October 28, 2014 request for immediate access to all documents referenced or relied upon in the RDEIR. I spoke with Ms. Cross yesterday, who guided me to two of the document sets we requested, which were mislabeled on the CD that the County provided to us, including: (1) Phillips 66, 2014, Data Response #8, July 29, 2014; and (2) Phillips 66, 2012, Ambient Monitoring Data for 2009 through 2011. Not only were the files mislabeled, but unfortunately, the second document set (ambient monitoring data for 2009 through 2011) is not in a readable format and we cannot open the documents. Please provide the data in a usable format.

Further, as I told Ms. Cross yesterday, the County also failed to provide other documents referenced or relied upon in the RDEIR, including the supporting data for Table 4.1-4 and Table 4.1-5. While the RDEIR lists sources for these tables, those sources do not contain the underlying data necessary to verify the figures and conclusions in the RDEIR. For example, Table 4.1-4 (heater baseline emissions) cites BAAQMD, 2012b as the reference source. However, BAAQMD, 2012b, which is the Initial Study for the Marine Terminal Offload Revision Project, does not contain the underlying data for the heater baseline emissions necessary to verify Table 4.1-4 (i.e., the heat rate and NOx CEMS data in a useable Excel spreadsheet).[3] Also, Table 4.1-5 (rail baseline emissions) cites Appendix B for the calculations used to estimate rail emissions associated with baseline butane shipments. Appendix B includes a table called Baseline Annual Rail Emissions from Butane Transport (see p. B-2), which cites Phillips 66, 2014d as the reference source. However, Phillips 66, 2014d contains the same information as Appendix B and neither Phillips 66, 2014d nor Appendix B provide the underlying data to verify Table 4.1-5 (i.e., the amount of butane recovered and shipped by rail from the refinery (barrels per each baseline year)).

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[1] *See* Pub. Resources Code, § 21092(b)(1); 14 Cal. Code Reg., § 15073.
[2] Pub. Resources Code, § 21091(a).
[3] I received an email from Ms. Cross this morning stating that Appendix C to BAAQMD, 2012b contains the data to support Table 4.1-4. However, Appendix C is not included in the BAAQMD, 2012d document that the County provided to us. If Appendix C does, in fact, include the heat rate and NOx CEMS data to support Table 4.1-4, please provide it to us in a useable Excel spreadsheet.

Finally, the County failed to provide the underlying data related to Phillips 66 Marine Terminal III to support Tables 4.1-13 and Table 4.1-14 of the RDEIR. In response to my conversation with Ms. Cross yesterday regarding this information, she sent me Phillips 66's application to BAAQMD for the Marine Terminal III project. However, the application contains no emissions data or calculations.

The County still has not made all documents referenced or relied on in the RDEIR available for public review during the entire public review period, as required by CEQA. As I stressed in my previous letter and during my conversations with Ms. Cross, without access to all documents referenced or relied on in the RDEIR, the public cannot meaningfully review the RDEIR's analyses, conclusions and mitigation measures related to the Project's air quality, greenhouse gas emissions and public health impacts. Therefore, we reiterate our request that the comment deadline be extended 45 days from the date that all documents referenced or relied on in the RDEIR are made available for public review.

Thank you for your attention to this matter. Please feel free to contact me at (650) 589-1660 to discuss further.

Sincerely,

Rachael E. Koss

REK:clv

ATTACHMENT B

Comments

on

Recirculated Final Environmental Impact Report

for the

Phillips 66
Propane Recovery Project

Rodeo, California

Prepared

for

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Introduction

Our comments on the Recirculated Draft Environmental Impact Report ("RDEIR") for the Propane Recovery Project ("Project") at the Phillips 66 Rodeo refinery ("Refinery") are included in Attachment 1 to Comment Letter B11 from Adams Broadwell Joseph and Cardozo ("ABJC"), representing Safe Fuel and Energy Resources California ("SAFER"). We wrote 47 pages of very detailed technical comments, supported by 13 exhibits, 61 references and calculations, two figures, and eight tables. None of our comments are addressed in the Recirculated Final Environmental Impact Report ("RFEIR"). Rather, the RFEIR categorizes them all, in one lump sum, as Comment B11-25, asserting: "This comment summarizes issues raised in previous comments. See Master Responses 2.2, 2.4 and 2.6 and Responses B11-1 through B11-23." RFEIR, p. 3.2-253. This is incorrect.

In fact, the reverse is true. Our comments on the RDEIR were **summarized** in other comment letters, principally those submitted by our client, Adams, Broadwell, Joseph and Cardozo, on behalf of SAFER California (Comments B11-1 to B11-24). We also shared our comments with others, including Communities for a Better Environment ("CBE") (Comment Letter B10) and Shute Mihaly Weinberger ("SMW") (Comment Letter B6). The RFEIR's responses to comments summarily dismisses all of our (Fox/Pless) comments, pointing to its responses to summaries of our comments made by others. This is a major error, which has resulted in a total failure to respond to our comments.

Our comments, dismissed in Response to Comment ("RTC") B11-25, contain the detailed technical analysis and support for the summary comments in Comment Letters B6, B10, and B11. Because the RFEIR responded only to summaries of our comments in a general way, rather than our actual comments, it has failed to provide meaningful responses. Thus, we re-assert almost all of our original comments. Our comments are not directly or adequately addressed in the RFEIR, either in responses to the summary letters or in the master responses.

The following comments respond to the RFEIR's response to comments on SAFER's letter, B11, which is a summary of our (Fox/Pless) much more detailed letter dismissed in RTC B11-25 by referring back to Master Responses 2.2, 2.4 and 2.6 and RTC B11-1 through B11-23. The following sections are organized as in our original letter, which is found in the RFEIR as Attachment 1 to Comment Letter B11.

Fox/Pless Comment II. The Project Is Piecemealed

We explained the Project is one of five inter-related projects whose goal is to incorporate cost-advantaged crudes into the refinery crude slate based on the following: (1) current crude supply is in decline; (2) widely reported plans by Phillips 66 to import cost-advantaged crudes; (3) five closely related Phillips 66 projects; (4) the RDEIR's asserted vapor pressure constraints are invalid; and (5) inadequate propane/butane content in current crude slate.

The RFEIR does not respond to our comments, but rather only to SAFER's summary of our comments at RTC B11-6 and B11-7. The response to summary comments B11-6 and B11-7, in turn, refers to Master Response 2.4, which discusses recoverable propane and butane, and Master Responses 2.2 and 2.4, which discusses piecemealing and crude feedstocks. These master responses are just summaries of the unsupported discussion in the DEIR, RDEIR and RFEIR and add nothing new. These summaries do not respond to any of the issues that we raise in our Comment II.

We demonstrated in our Comment II.E, pp. 9-13 (RFEIR pp. 3.2-199/203), that baseline fuel gas did not contain sufficient propane and butane to support the stated Project recovery goals. The RFEIR does not respond to any of our comments on this issue, but rather points to Master Response 2.4, which regurgitates the information in the RDEIR that we rebutted in our comments. There is no response to our rebuttal.

We further note that a major capital project, such as this one would not be designed based on the single August 2011 sample, which is presented as the baseline. It is much more likely that the Refinery conducted a detailed study, involving many tests, including testing a range of cost-advantaged crudes that would replace its existing declining crude slate. The August 2011 sample is likely just one of many, chosen to support the otherwise unsupported claim as to the amount of propane and butane in baseline fuel gas.

The August 2011 sample, for example, may have been collected when the Refinery was running a test using Bakken crude or a tar sands DilBit, both of which are rich in propane and butane. Master Response 2.4 asserts without support that "… between the 2011 design basis and the 2013 data, no change to crude feedstocks… has been made." This statement is entirely unsupported.

The record does not disclose the crude slate that was run during any of the tests used to support the claim that the baseline crude slate could produce 14,500 barrels per day ("bbl/day") of propane/butane or that no change in crude slate occurred between 2011 and 2013. Based on my experience working in the refining industry (Fox), a company typically runs sample crude slates that it is considering when designing a project such as proposed here. As the existing crude slate is in long-term decline, it would have been irresponsible to design the Project without conducting tests on crudes

that were being considered as replacements. The replacement crudes have been widely reported by Phillips 66 in investor presentations which we cited in our comments. The RFEIR is silent on these public disclosures. Thus, the RFEIR's assertions as to the amount of recoverable propane and butane, without disclosing the crude slate run during each test, do not confirm the RFEIR's claim that the stated amount of butane and propane can be recovered without changes in crude slate.

The RFEIR is totally silent on the impact of the well-documented crude slate decline on future changes in crude slate composition as well as our rebuttal of the RDEIR's asserted artificial vapor pressure constraint used in the RDEIR as evidence that Phillips 66 Santa Maria Refinery ("SMR") and Rodeo were not linked. We demonstrated the RDEIR's asserted vapor pressure constraint is false.

Fox/Pless Comment III. Project Operational Emissions Are Underestimated

We demonstrated in 23 pages of text, supported by independent calculations in four tables and numerous footnotes that the RDEIR: (1) used the wrong emission estimating methodology; (2) underestimated locomotive emissions; (3) underestimated nitrogen oxide ("NOx") emissions by relying on NOx reductions that do not exist; (4) underestimated greenhouse gas ("GHG") emissions by excluding emissions outside of the Bay Area Air Quality Management District ("BAAQMD") and excluding emissions from the use of propane and butane; and (5) excluded other emission sources. We proved based on both the record and calculations that the Project would result in significant NOx and GHG impacts when the RDEIR's errors are corrected. The RFEIR does not respond to any of our comments. Rather, the RFEIR responds to SAFER's summaries of these comments in summary fashion in RTC B11-3 (missing data), RTC B11-11 (emission estimating methodology), RTC B11-12/14 (locomotive emissions), RTC B11-15 (heater B-401), RTC B11-16 (other emission sources), and RTC B11-17 (GHG emissions). The technical issues that we raised in our original comments are not addressed.

Comment B11-11: Emissions Estimating Methodology Is Unsupported

SAFER summarized our Comment III.A at RFEIR 3.2-164 (Comment B11-11). We commented that the RDEIR did not explain how it calculated emission increases and did not disclose assumed baseline emissions, which must be calculated a particular way under the requirements of the California Environmental Quality Act ("CEQA"). RFEIR, pp. 3.2-203/205. The RFEIR responds to SAFER's summary of our comment (B11-11) by ignoring our comment and asserting: "This procedure has been reviewed and approved by the BAAQMD as the correct approach, as it shows the resulting change in emissions that would result from the proposed project." RFEIR, p. 3.2-246.

The BAAQMD's method of calculating emission increases, pursuant to its regulations implementing the Clean Air Act, is irrelevant for CEQA purposes, which requires the use of "actual" emissions to establish the baseline, rather than permitted emissions. Further, the major source of NOx emissions, locomotives, is not even regulated by the BAAQMD. This response further fails to identify any record evidence of the BAAQMD's comment on this matter. Finally, our comment noted that the RDEIR failed as an informational document as it does not disclose how it calculated net emission increases, *i.e.*, the RDEIR failed to tabulate the assumed baseline and future Refinery emissions. The RFEIR continues to exclude this critical information.

Comment B11-12: The Project's Increase in Locomotive Emissions Are Underestimated

SAFER summarized our Comment III.B in Comment B11-12. The RDEIR assumed the number of rail cars would increase from 8 per day to 20 per day, resulting in an increase in NOx emissions of 10.18 tons per year ("tons/year"). RFEIR, p. 3.2-165. Our comments demonstrated, based on substantial information in the record, that the Project would increase the number of rail cars from an annual average of 4 per day to a maximum of 24 per day, resulting in an increase in NOx emissions of 13.85 tons/year. RFEIR, pp. 3.2-205/212 and 3.2-238/239. RTC B11-12 to SAFER's summary of our comment simply re-asserts the information in the RDEIR, stating we are wrong, without explaining why or addressing any of our voluminous evidence to the contrary. Further, the RFEIR misunderstands the difference between "average annual daily rail cars" (12) and "maximum daily rail cars" (16), which must be used for estimating daily emissions and impacts on ozone formation.

Comment B11-13: The Baseline for Locomotive Emissions Is Inflated

SAFER summarized our Comment III.B.1 in Comment B11-13. The RDEIR estimated baseline locomotive emissions, assuming 8 rail cars per day. RFEIR, p. 3.2-166. We demonstrated through substantial evidence in our Comment III.B.1 that the average number of rail cars loaded with butane and propane in the baseline is 4 per day. RFEIR, pp. 3.2-205/206. The baseline must be based on the average, not the maximum.

In response only to SAFER's summary of our comments (B11-13), the RFEIR dodges completely the key baseline issue of 4 versus 8 rail cars per day and simply restates the RDEIR's unsupported claim that the Project would increase the number of rail cars "by up to 12 per day on an annual average, with a maximum increase of up to 20 on any given day" without even mentioning the baseline, which is the heart of our comment. Response B11-13, p. 3.2-246. The RDEIR's response fails to address any of the evidence we present that demonstrates the assumed baseline of 8 rail cars per day, used to calculate the increase of 20 rail cars per day, is wrong.

Comment B11-14: Annual Average Locomotive Emissions Are Underestimated

SAFER continued its summary of our Comment III.B.1 in Comment B11-14. In Comment III.B.1, we revised the RDEIR's estimate of annual average locomotive emissions, correcting errors including: (1) increase in amount of propane/butane that could be loaded in the future; (2) increase in number of rail cars per day (12 to 16); and (3) increase in on-site locomotive idling time.

The RFEIR's response to this comment continues to assert the Project would only increase the number of rail cars per day by 16, failing to address substantial evidence to the contrary in the record that the actual increase is 20 per day. *See* our Comment III.B.1 in the RFEIR at 3.2-205/206 and 3.2-238/239. This response also fails to address the fact that the proposed permit limit would allow more propane and butane to be loaded than could be contained in the assumed increase in rail cars. RFEIR, p. 3.2-208.

The RFEIR concedes it underestimated idling time for the switch locomotive, and doubled it from 1 hour in the baseline to 2 hours, assuming an increase of 12 additional rail cars. However, as demonstrated in our Comment III.B.1, the Project would increase the daily number of rail cars from 4 to 20, or by 16 additional rail cars per day, not 12 as incorrectly assumed in the RFEIR. Thus, the increase in idling time for the switch locomotive should be 3 hours (16/12×2=2.7). This would increase emissions of all pollutants from locomotives by 4.3% (3.2%×2.7/2=4.3) based on the RFEIR's calculations at p. 3.2-246. (This calculation only accounts for increased idling of the switch locomotive but not increased idling of the haul locomotives at the site due to the increased number of rail cars that would be connected to each train, a fact the RFEIR denies. RFEIR, p. 3.2-250.)

SAFER further summarized our Comment III.B.4, which revised locomotive emissions to include emissions outside of the BAAQMD and along different routes within the BAAQMD. RFEIR, pp. 3.2-213/216. The RFEIR's response in RTC B11-14 argues that the destination of the propane and butane is unknown and thus additional emissions from other routes are speculative and need not be considered. RFEIR, pp. 3.2-246/247. However, the routes are not speculative, but rather undisclosed by the applicant.

The RFEIR's claim ignores our comment at p. 3.2-222 that explains "Phillips 66 has a long history of recovering and selling butane and thus has an established market... Thus, it is reasonable to assume that Phillips 66 would continue to sell into this market, which is known." In spite of this obvious fact, the RFEIR continues to exclude this important known information and instead argues the destination of its propane and butane is speculative.

The routes are not "speculative" under CEQA. First, based on our experience in the refining industry (Fox), it is not believable that a major capital project would be built

without the proponent having thoroughly researched the market and/or without partnering with a customer. The applicant has simply failed to disclose its marketing plan. Second, Phillips 66 has an existing market for its butane, which has not been disclosed and is material to locomotive emissions. Third, we note that the RFEIR knew the train routes well enough to estimate GHG emissions outside of the BAAQMD (RFEIR, p. 3.2-213) and transportation energy use outside of the BAAQMD (RDEIR, p. 4.3-9 through 4.3-11). Fourth, even assuming, *arguendo*, that there is uncertainty in the exact routes, it is standard practice in emission estimating to bound the range by estimating emissions for both the shortest likely travel distance and the longest and reporting the upper bound. If the RFEIR wishes to exclude the upper bound (as it results in a significant unmitigated impact, the RFEIR should be modified to include a condition that limits sales to within the BAAQMD. However, the RFEIR currently allows out-of-state sales without mitigating the resulting highly significant NOx and ROG impacts. RFEIR, p. 3.2-213/215.

Locomotive emissions within the BAAQMD were estimated assuming the trains would travel to the eastern boundary half of the time and to the southern boundary the other half of the time. However, there is nothing in the RFEIR that would preclude all of the trains from traveling south out of the District, which would increase NOx emissions enough to exceed the daily NOx significance threshold. This is not "speculative" as there are only two routes and each is known.

The southern route is a plausible scenario, as the largest potential market lies to the south of the BAAQMD. In this situation, it is standard practice to bound the emission range by estimating emissions assuming 100% of the trains exit to the east and 100% to south and evaluating the impacts for the maximum emission case. The maximum emissions occur when all trains exit to the south, increasing NOx emissions enough to exceed the BAAQMD's daily CEQA significance threshold for NOx. Thus, the RFEIR must either mitigate these significant emissions or impose limits on routes that may be used.

The RFEIR used this approach in the Health Risk Assessment ("HRA") to estimate diesel particulate emissions from locomotives. The RFEIR estimated health impacts from diesel particulate emissions assuming that 100% of the locomotives would take the southern route and 100% would take the northern route and reported the worst case. RFEIR, Response B11-18, p. 3.2-250. This is the correct method of addressing uncertainty. It is not speculative to bound impacts when the range is obvious. The RFEIR should have followed the same procedure for criteria pollutant emissions. As we note at RFEIR p. 3.2-215, the southern route would result in NOx emissions of 57 pounds per day ("lbs/day"), which exceeds the BAAQMD's significance threshold of 54 lbs/day. Thus, using the same approach the RFEIR itself uses to evaluate health risks, the Project results in a significant unmitigated daily NOx impact.

Finally, the RFEIR in Response B11-14 correctly notes that we compared out-of-BAAQMD emissions to BAAQMD CEQA significance thresholds. RFEIR, p. 3.2-247. Thus, we here revise our analysis. Adjusting the proportion of the total NOx emissions reported in our Table 5 (RFEIR, p. 3.2-214) using the air district mileage estimates from the SMR Rail Spur RDEIR, p. B-9, the daily NOx emission increases along the southern route from the Project's locomotives exceed the daily significance thresholds for NOx of all air districts through which trains pass and are, thus, significant. Further, annual increases in NOx emissions from the Project's locomotives travelling through the Santa Barbara County Air Pollution Control District ("SBCAPCD") are also significant. These are new significant impacts that are not disclosed in the RFEIR and are not mitigated.

Table 1
Revised Daily NOx Emissions by Air District
Based on Southern Route

District	Miles	Emissions (lbs/day)	Significance Threshold	Exceeds Significance Threshold?
BAAQMD	90	**71**	54	**YES**
SBCAPCD	216	**171**	55	**YES**
SLOAPCD	134	**106**	25	**YES**
VCAPCD	116	**92**	25	**YES**
SCAQMD	176	**139**	55	**YES**
Total	**732**	**579**		

Table 2
Revised Annual NOx Emissions by Air District
Based on Southern Route

District	Miles	Emissions (lbs/day)	Significance Threshold	Exceeds Significance Threshold?
BAAQMD	90	9	10	no
SBCAPCD	216	**22**	10	**YES**
SLOAPCD	134	14	25	no
VCAPCD	116	12	-	
SCAQMD	176	18	-	
Total	**732**	**75**		

Comment B11-15: The NOx Emission Reductions for Heater B-401 Are Invalid

SAFER summarized our Comment III.C (RFEIR pp. 3.2-216/220) in Comment B11-15. RFEIR pp. 3.2-170/172. In our comments on Heater B-401 emission reductions, we demonstrate through detailed analysis of the underlying BAAQMD permitting documents and *de novo* emission calculations that the annual and daily NOx emission reductions from the shutdown of heater B-401 are imaginary and do not exist. The RFEIR does not address any of our analysis, but rather only the summary presented in SAFER Comment 11-15.

First, we note in our Comment III.C that the heater shutdown occurred in 2011, during the CEQA baseline, and thus the reductions are part of the baseline. As such, they are not available to offset emission increases. RFEIR, p. 3.2-217. The RFEIR does not respond to this comment.

Second, we note in our Comment III.C that the emissions from the shutdown of the heater were replaced by increased NOx emissions from a similar new heater at the adjacent hydrogen plant which would supply the Refinery. RFEIR, p. 3.2-217. In response, the RFEIR asserts that "even if the off-site location releases NOx... it does not change the fact that Phillips 66 still has the option of using its remaining NOx credits..." RFEIR p. 3.2-247, Response B11-15. While this may be true under the BAAQMD's permitting regulations, it is not valid under CEQA as the net effect of shutting down one heater and starting up another adjacent heater is a net change of zero. The shutdown of heater B-401 does not reduce NOx emissions and thus does not mitigate the impact.

The response further asserts that NOx emissions from the new adjacent heater are "stringently limited by that permit." RFEIR p. 3.2-247, Response B11-15. However, the response does not disclose the actual permitted NOx limit of the new Hydrogen Plant heater. The permitted limit would only be material if it were stringent enough to result in a NOx reduction credit from the shutdown of Heater B-401.

Third, the RFEIR uses 10.8 tons/year of NOx reductions to offset significant annual NOx emission increases from the Project. We demonstrated using BAAQMD permitting documents that the 10.8 tons/year of NOx reductions do not exist. RFEIR pp. 217/220. Our analysis demonstrates these NOx reduction were created by changing the original Heater B-401 NOx baseline from March 4, 2009 to March 3, 2012 to July 25, 2009 to July 24, 2014. Thus, annual NOx emissions are significant and unmitigated. The supporting data used in the RFEIR to calculate the heater shutdown NOx reductions using a new baseline period was never produced, despite several requests. RFEIR, pp. 3.2-217/218. Master Response 2-1, which addresses supporting data issues, also fails to address this missing data, as does RTC B11-3. The missing data were specifically requested in public records act requests ("PRAs") dated December 1, 2014 and December 3, 2014.

The only response to our detailed analysis of this issue at RFEIR pp. 3.2-217/220 is the unsupported assertion: "There was no shifting of baseline dates or double counting used..." This fails to address the substantial evidence rebutting this presumption in our Comment III.C.1 at RFEIR pp. 3.2-217/220.

Fourth, we pointed out the RDEIR failed to adjust the NOx reductions for Reasonably Available Control Technology ("RACT") before applying them, which is

required under BAAQMD regulations. RFEIR, p. 3.2-218. Assuming, *arguendo*, that emission reduction credits are valid CEQA mitigation, RACT-adjustment would have reduced the available NOx reductions available below the threshold required to offset significant impacts. The responses to comments are silent on RACT adjustment.

Fifth, the RDEIR used 62.3 lbs/day of daily NOx reductions from the shutdown of Heater B-401 to offset significant daily NOx emissions from the Project. We demonstrated that 100% of the daily NOx reductions during the baseline years were used to offset daily NOx emission increases from the applicant's Marine Terminal project. RFEIR, p. 3.2-220. Thus, no daily NOx emissions remain to offset Project daily NOx emission increases, and daily NOx impacts are significant and unmitigated. We also noted that the data relied on to estimate daily NOx reductions were not produced, despite several requests. RFEIR, p. 3.2-220. The master response to comments, Master Response 2-1, also fails to address these missing data and fails to even mention our PRAs dated December 1 and 3, 2014 in which they were specifically requested.

The only response to our detailed analysis of this issue at RFEIR pp. 3.2-217/220 is the unsupported assertion: "There was no shifting of baseline dates or double counting used..." This fails to address the substantial evidence rebutting this presumption in our Comment III.C.2 at RFEIR pp. 3.2-220.

Finally, emission reduction credits are not valid CEQA mitigation as they occur at different locations and times than the emission increase that must be mitigated.

Comment B11-16: Emissions from Other Sources

We commented in our Comment III.E that the Project would increase emissions from the Sulfur Recovery Unit and the Hydrogen Plant. RFEIR, pp. 3.2-224/225. SAFER summarized our Comment III.E in Comment B11-16. RFEIR, pp. 3.2-172/173. The RFEIR response does not address either SAFER's summary or our more detailed underlying comment, but rather refutes itself.

The RDEIR admits emissions from the Sulfur Recovery Unit will increase, but asserts without support that they "will not be discernible" and would be "speculative." RFEIR, p. 3.2-224. We commented that even small increases are important here, as emissions are close to the significance threshold, *e.g.*, ROG emissions are 8.4 tons/year compared to the significance threshold of 10 tons/year. RFEIR, p. 3.2-224/225. The RFEIR does not respond to this, but rather asserts without support: "This comment has been previously raised and addressed in the RDEIR." RFEIR, p. 3.2-248. However, the RFEIR does not cite a page. Obviously, if the comment was re-raised, explaining that small increases are important, the issue has not been addressed. The RFEIR does concede that the increase would be about 0.2% of total sulfur production, but fails to convert this increase into criteria pollutant emission increases.

In an unrelated response, the RDEIR admits that ancillary equipment required to increase sulfur recovery and operate the new hydrotreater would increase electrical demand by 1.28 MW. RTC B11-22. Supplying this demand would increase criteria pollutant emissions, which were omitted from the RFEIR.

Using default emission factors for consumption of electricity developed by the South Coast Air Quality Management District ("SCAQMD"),[1] the generation of 1.28 MW of electricity would emit 6.4 tons/year and 35 lbs/day of NOx.[2] This would increase Project annual NOx emissions from 3.1 tons/year (RDEIR, Table 4.1-10) to 9.5 tons/year, which is just 0.5 tons/year shy of the BAAQMD's significance threshold of 10 tons/year. Similarly, this omitted emission source would increase Project daily NOx emissions from 35.1 lbs/day (RDEIR, Table 4.1-9) to 70 lbs/day, which exceeds the BAAQMD's significance threshold of 54 lbs/day. Thus, this late admission of an increase demand of 1.28 MW of electricity in the RFEIR to support the Sulfur Recovery Unit and the new hydrotreater, uncovers a new significant impact when it is converted into emissions. This impact was not previously identified and is unmitigated, even including the invalid NOx offsets.

We also commented that the Project would increase emissions from the off-site Hydrogen Plant that the County previously admitted in responses to BAAQMD comments, but which it failed to include in the RDEIR. The County's prior admission included an increase in emissions of an unidentified criteria pollutant of 1.7 tons/year. We commented that if this unidentified pollutant were NOx, this would be enough to result in a significant NOx impact, when the offset error is corrected. RFEIR, p. 3.2-225.

The RFEIR's response to Comment B11-16, rather than identifying the pollutant associated with the 1.7 tons/year, asserts, based on the original DEIR, that "[t]here is no relationship between the proposed Project and the hydrogen plant". This is contrary to the County's responses to BAAQMD comments and the design of the Project. RDEIR, p. 3.2-224, footnote 50. The Air Liquid Hydrogen Plant will supply hydrogen to the new hydrotreater. *See* also our response to RTC B11-22.

Thus, the Project will cause an increase in emissions at the Hydrogen Plant. The County estimated the increase in responses to comments made by the BAAQMD, but

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[1] SCAQMD, CEQA Air Quality Handbook April 1993, Table A9-11.

[2] NOx emissions from generating 1.28 MW of electricity: (1.15 lb/MWh)(1.28 MW)(8,760 hours/year)/(2000 lbs/ton) = **6.45 tons/year.** (*See* RDEIR, Table 4.3-3, which assumes operation 24 hours/day and 365 days/year.)

The increase in daily NOx emissions: (6.45)(2000 lbs/ton)/(365 days/year) = **35 lbs/day.** (*See* RDEIR, Table 4.3-3, which assumes operation 24 hours/day and 365 days/year.)

failed to include them in the RDEIR or identify them in its RTC B11-25. Thus, our comment as to the increase in Hydrogen Plant emissions has not been addressed.

Comment B11-17: Failure to Identify and Reduce the Project's Significant Greenhouse Gas Emissions Impacts

We demonstrated in our Comment III.D that the Project would increase greenhouse emissions from the use of the recovered propane and butane. RFEIR, pp. 3.2-220/224. SAFER summarized our comment in Comment B11-17. RFEIR, pp. 3.2-173/175. The RFEIR asserts it responds in RTC B6-10 (which refers to Master Response 2.4, which does not discuss greenhouse gases!), RTC B6-11, and RTC B11-17. However, the response to these comments fail to address either SAFER's summary or our more detailed underlying comment.

The RFEIR's responses argue that the end use of the propane and butane are "speculative" and thus need not be analyzed under CEQA. We explained in detail why the end use is not speculative in our Comment III.D and explain below why the RFEIR has failed to address our comments.

The RFEIR's responses argue that the end use of recovered propane and butane is "speculative", making the same arguments the RFEIR made with respect to train travel outside of the BAAQMD in RTC B11-14. The speculative argument is also not creditable here for the same reasons we explain in response to RTC B11-14.

First, we commented that "Phillips 66 has a long history of recovering and selling butane and thus has an established market... Thus, it is reasonable to assume that Phillips 66 would continue to sell into this market, which is known." RFEIR, p. 3.2-222. In spite of this obvious fact, the RFEIR continues to exclude this important known information and instead argues the destination of its propane and butane is "speculative". The only response is that the Refinery currently does not recover butane, ignoring the obvious fact that the Refinery must know or could discover how its propane is currently being used. RFEIR, p. 3.2-249. As it will recover more propane, it is reasonable to assume that it will be used similarly.

Second, we commented, based on our experience in the refining industry (Fox), that it is not believable that a major capital project would be built without the proponent having thoroughly researched the market and/or without partnering with a customer. The applicant has simply failed to disclose the uses. The RFEIR does not respond to this obvious fact.

Third, we commented that the RFEIR knew the train routes well enough to estimate GHG emissions and transportation energy use outside of the BAAQMD. RFEIR, p. 3.2-213. The RDEIR, for example, estimated the increase in fuel consumption

for the trains to travel to the California-Arizona border. RDEIR, p. 4.3-9. Thus, it is inconceivable that the RFEIR cannot estimate emissions from the use of propane and butane itself. The design basis of the Project itself bounds the universe of uses.

Fourth, even assuming, *arguendo*, that there is uncertainty in some potential uses, others are likely well known. It is standard practice in emission estimating to bound the range by estimating emissions based on reasonably anticipated uses. This is not "speculation" but a standard method for dealing with uncertainty. If the RFEIR wishes to exclude all uses of its propane and butane that would release greenhouse gases, most of which would result in significant unmitigated impacts, the RFEIR should be modified to include a condition that limits sales to uses that do not release greenhouse gases. However, the RFEIR currently allows any use, most of which emit greenhouse gases. RFEIR, p. 3.2-220/224.

Fifth, we commented that the liquefied petroleum gas ("LPG") facility is being designed to produce commercial-grade propane and butane. RFEIR, p. 3.2-22. The primary use of commercial-grade LPG is as a fuel. The RFEIR did not respond to this comment. Based on this unrebutted fact, we conservatively estimated the increase in GHG emissions from combusting only 1,000 bbl/day of propane in boilers in California. This is only 7% of the design daily production of 14,500 bbl/day and represents a very conservative lower bound of GHG emissions from the end use of propane and butane. The RDEIR states that this estimate "is based on purely speculative assumptions..." RFEIR, p. 3.2-249. However, this fails to address the fact that the Project is being designed to produce commercial grade LPG, whose primary use is as a fuel. Assuming that a mere 7% of the total production would be used as a fuel is a very conservative lower bound, based on the RFEIR's own admission of the design-basis of its facility. Thus, it is not speculation.

Sixth, the potential uses, including chemical blending, chemical feedstock, gasoline blending, and gasoline feedstock (RFEIR, p. 3.2-249), result in GHG emissions when they are processed (chemical blending, chemical feedstock) or when they are combusted (gasoline). We are not aware of any common use for propane and butane that would not ultimately generate GHG emissions and the RFEIR has not disclosed any.

Finally, we commented that the County estimated the increase in greenhouse gas emissions from supplying hydrogen to the new Hydrotreater at 43,000 metric tons per year ("MT/year"). RFEIR, p. 3.2-225. The increase in greenhouse gas emissions from this source alone is nearly big enough to offset the claimed decrease in greenhouse gas emissions (43,000 vs. 43,606 MT/year[3]). If other omitted sources of GHGs are included,

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[3] RDEIR, Table 4.5-3.

such as the 4,000 MT/year from using 1.28 MW of additional electricity at the Sulfur Recovery Unit and new Hydrotreater, GHG emissions would exceed the significance threshold, without assuming any additional GHG emissions from use of the produced propane and butane. The RFEIR does not respond to this issue.

Fox/Pless Comment IV: Cumulative Impacts

The RDEIR prepared a cumulative analysis for health impacts, but did not include a cumulative analysis for other impacts, instead arguing that none was required as Project impacts are not significant. However, as explained in ABJC's legal analysis on behalf of SAFER, Comment B11-19, this is the wrong test. Thus, we prepared cumulative air quality, GHG, and hazard impact analyses to supplement the RFEIR's inadequate analysis.

Comment B11-19: Cumulative Impacts Legal Framework

Several parties laid out the legal basis for assessing cumulative impacts, including ABJC on behalf of SAFER (Comment B11-19) and SMW (Comments B6-12/14) on behalf of the Rodeo Citizens Association. The RFEIR's responses to these comments generally refer to master responses addressed elsewhere in responses to comments. The responses to the legal claims are provided in the companion legal responses.

In response to Comment B11-19, the RFEIR reiterates that project impacts that are not individually significant cannot be cumulatively significant, based on BAAQMD CEQA guidance for criteria pollutant emissions. RFEIR, p. 3.2-251. This is wrong for two reasons. First, our comments, which the County did not respond to, demonstrate based on substantial unrebutted evidence, that the Project would result in significant air quality, greenhouse gas, public health, and hazard impacts. Thus, even if the RFEIR were correct on legal framework, the County would still be obligated to analyze cumulative impacts as they are individually significant.

Regardless, the RFEIR's RTC B11-19 is wrong. Local agency guidance does not trump state law, as explained in the companion legal responses by ABJC on behalf of SAFER.

Comment B11-20: Cumulative Project List Is Incomplete

This comment identified 10 projects that were not included in the cumulative impact analyses. RFEIR, pp. 3.2-178/179 and 3.2-226/227. The RFEIR responds in Master Response 2.6. This master response argues there are two types of cumulative projects that were variously identified by commenters as missing: (1) remote projects

that are not spatially related (RFEIR, p. 2-13) and (2) projects whose "nature" differs from the project, *i.e.*, those involving rail transport of crude. RFEIR, p. 2-15.

Master Response 2.6 wrongly argues that neither must be included in cumulative impact analyses as they have no "nexus" for evaluation of the Project's cumulative impacts. RFEIR, p. 2-13. A cumulative project does not need to have a "nexus" with the project to cumulatively contribute to the project's impact. The cumulative projects need only add to the incremental increase of the impact from the project under review, as explained in the companion ABJC legal responses on behalf of SAFER.

The remote projects are those at the SMR, which the RFEIR concedes is connected to the Rodeo Refinery by a 200-mile long pipeline. RFEIR, p. 2-12. However, Master Response 2.6 goes on to argue that the two refineries are not related and thus not cumulative. RFEIR, pp. 2-12/13.

However, these two refineries operate as a single refinery. The SMR produces semi-refined products - gas oil and pressure distillate - which are sent to Rodeo for further refining into finished products, such as gasoline. RFEIR, p. 3.2-192. Thus, any change in throughput or feedstock composition at SMR will affect emissions at Rodeo, even though they are 200 miles apart. Some examples follow.

First, if SMR increases its throughput, this will increase the amount of semi-refined products sent by SMR to Rodeo, potentially increasing emissions of ROG and hazardous air pollutants ("HAPs") from tanks that store the products at Rodeo and processes that convert them into finished products at Rodeo.

Second, if SMR imports Bakken or tar sands crudes, the semi-refined products sent to Rodeo will contain much higher amounts of benzene and other HAPs than the current slate. Higher amounts of benzene and other HAPs will be released from storage tanks and fugitive components at Rodeo, increasing health impacts at Rodeo.

Third, the refining of semi-refined products from tar sand crudes at Rodeo, the stated target of the Santa Maria Crude by Rail project, will generate more GHG at Rodeo than refining of the current slate, as more energy is required to break them down into blendstocks.

Fourth, unit trains carrying tar sands or Bakken crude to Santa Maria will pass through the BAAQMD, close to the Rodeo refinery, using some of the same rail lines used by Project trains. The emissions that these trains release within the BAAQMD and elsewhere along the rail tracks must be included in the cumulative air quality and health risk analysis as they add to the increment from the Project.

Fifth, hazard impacts are not limited "spatially" to the local level, as argued in Master Response 2.3, because the LPG trains use the same tracks as crude and other

trains, regardless of where those tracks are located. An increase in rail traffic due to the SMR and remote rail terminals, for example, will contribute incrementally to the probability of an accident involving the LPG trains, regardless of what they carry or where they are located.

Thus, projects at the SMR, 200 miles from Rodeo and the rail terminal in the Bakersfield area cause emission increases at and near Rodeo. They cannot be eliminated based on distance and must be included in the air quality, GHG, public health, hazard, and other cumulative impact analyses. Further, the increase in trains using the same tracks as the LPG trains, where ever they are, will increase the probability of accidents involving the LPG trains.

The RFEIR attempts to sever this obvious link between SMR and Rodeo. First, it argues: "the proposed Project is not dependent on any aspect of the projects underway at the SMF [Santa Maria Facility].". Second, it argues that the Project is not linked to nor reliant on crude oil feedstock at either refinery. Third, it argues: "The SMF throughput increase, while representing a future change to the SMF refinery operation, was not considered cumulative as the proposed Project is based on existing RFG [refinery fuel gas] from the Rodeo Refinery alone..." RFEIR, p. 2-13. A cumulative project need only add to the increment from the Project. There is no requirement that a cumulative project have a "nexus" with, be dependent on, or be based on the project itself. More semi-refined products or a change in the composition of semi-refined products from SMR adds to the impacts of recovering additional propane and butane at Rodeo.

Master Response 2.6 argues that these "remote" projects at Santa Maria cannot be both piecemealed and cumulative. RFEIR, p. 2-13. We agree. However, these projects were omitted completely. Their impacts were not included as direct project impacts, assuming piecemealing, nor as cumulative impacts. They must be included in the impact analyses, either as part of the Project or as cumulative projects because the Santa Maria and Rodeo refineries function as a single refinery, known as the San Francisco Refinery. RFEIR, p. 2-12. The RFEIR cannot reject them on both counts.

With respect to hazards, Master Response 2.6 also argues that projects involving transport by rail (Santa Maria Rail Spur and the rail terminals (listed at RFEIR, p. 3.2-227) are not cumulative projects because "they do not involve the transport of LPG by rail" but rather oil, and their "nature" is different. RFEIR, p. 2-15. The CEQA definition of "cumulative" does not require that cumulative projects be identical or contribute to impacts in the same way, only that they add to the increment from the project itself. A locomotive that emits NOx, for example, can cumulatively contribute to an increase in NOx emissions from a refinery heater.

Master Response 2.3 also argues that cumulative projects must have the same "nature" to be considered cumulatively. The RFEIR asserts that with respect to hazards, "given that the type of tank car carrying LPG and crude oil are quite different... evaluation of cumulative hazards between these dissimilar tank cars and... many other commodities carried by rail, cannot be done in any meaningful way." RFEIR, p. 2-14. This makes absolutely no sense. Any project that increases rail traffic along the rail lines used by the Project's trains will increase the probability of accidents, regardless of what the other rail cars might be carrying. We listed the projects that would increase rail traffic along the same rail lines used by the Project. They include the Santa Maria Rail Spur project plus the six new rail terminals we list at RFEIR, p. 3.2-227.

Further, locomotives transporting LPG, oil, corn or any other product emit pollutants that contribute to increases of the same pollutants as from the Project. Thus, the RFEIR's cumulative impact analysis did not but must consider cumulative hazards, air quality, and GHG impacts of all of these projects, including the rail terminal projects, taken together.

The RFEIR also attempts to excuse cumulative analysis of projects involving rail traffic by arguing that the Project "utilizes the same train trips by adding tank cars to existing trains and would not increase the total number of train trips. Therefore, the proposed Project does not make any contribution to potential cumulative impacts associated with increases in numbers of trains from other projects." RFEIR, p. 2-15. However, there is nothing in the RFEIR that restricts the Project to using the same total number of train trips to export the proposed increase in propane and butane. In fact, the RFEIR does not report daily train traffic data for a typical 365-day period to support this assertion.

Propane recovery and export is cyclical, to meet gasoline blending requirements. Propane must be removed during the summer when temperatures are high, but not in the winter. The Refinery would likely export LPG on fewer days in the baseline than after the Project is built. Thus, it is reasonable to expect that an increase in trips would occur. Further, an increase in LPG train trips is the wrong standard for triggering cumulative analysis, as explained in the companion legal responses.

Even assuming, *arguendo*, that an increase in train trips is required to trigger cumulative analysis, the number of train trips is not the only train-related metric that contributes to impacts that must be considered. The amount of LPG carried by each train would increase. In an accident, the amount of LPG released determines the severity of the consequences. Thus, more trains on the rail line from cumulative projects (and possibly the Propane Recovery Project, as there are no restrictions) increases the probability of accidents and more LPG per train increases the severity of an accident, when it occurs. The RFEIR has failed to analyze the potentially significant

increase in probability and severity of accidents due to the surge in train traffic on the same rails that Project trains would use, from the six new crude rail terminals listed in our comments. RFEIR, p. 3.2-225.

Further, hazards are not the only train-related cumulative impact that must be considered. The increase in the amount LPG carried by the Project's trains increases the emissions of criteria pollutants, GHGs, and HAPs. RFEIR, pp. 3.2-203/216 and 3.2-220/224; RDEIR, Tables 4.1-7 through 4.1-10. The increase in train trips from the cumulative "train" projects identified in our Comments (RFEIR, p. 3.2-227) share the same tracks as Project trains and emit the same pollutants within the BAAQMD as well as statewide. Thus, the incremental increase in emissions from the Project's locomotives must be added to the increases from the cumulative train projects to determine cumulative air quality, GHG, and health impacts.

Master Response 2.6 also argues that if the Santa Maria and Rodeo Marine Terminal projects are piecemealed, they cannot also contribute cumulatively. We agree. They are either piecemealed, or cumulative, not both. However, the impacts of the two Santa Maria projects that we identified are not included anywhere in the RDEIR or RFEIR. The facts in this case demonstrate that they are piecemealed. However, if the court decides against us on this point, they must then be evaluated cumulatively, as they contribute to air quality, GHG, health, and hazard impacts, among others, at Rodeo.

We commented that two Rodeo Marine Terminal Throughput projects (Phases II and III) were also omitted from the RDEIR's analyses. RFEIR, p. 3.2-226. Master Response 2.6 responds that these projects were considered in the RDEIR and cites Section 5.4.2.1 "Other Phillips 66 Refinery Projects". RFEIR, p. 2-15. However, this does not respond to our comment as we acknowledged that these two projects were included in the cumulative analysis of emissions of particulate matter equal to or smaller than 2.5 microns ("PM2.5") and health risk assessment. However, they were not considered in any other cumulative analysis. Thus, we prepared a cumulative analysis for NOx, ROG, and GHG emissions that does include them. RFEIR, pp. 3.2-226/234. The RFEIR does not respond as to other potential cumulative impacts from these projects, such as impacts to water quality and increases in water demand.

Comment B11-21: Cumulative Air Quality Impacts

This comment notes that the RDEIR did not analyze cumulative air quality impacts and explains why this analysis is required under CEQA. It then summarizes the results of a detailed cumulative air quality analysis that we prepared in our Comment IV.B. RFEIR, p. 3.2-179/180.

The RFEIR's responses in RTC B11-19 and RTC B9-31 attempt to redefine cumulative air quality impact analysis, as conducted under CEQA. They argue, in a nutshell, that cumulative air quality impacts are subsumed in the BAAQMD's CEQA significance thresholds, as the BAAQMD "considered the emission levels for which a project's individual emissions would be cumulatively considerable when combined with emissions of past, present, and future development projects." RFEIR RTC B9-31. Thus, RTC B9-31 and RTC B11-19 reason that if a project does not exceed the BAAQMD significant thresholds, which already include past, present, and future project, it cannot have a cumulatively significant impact.

Assuming, *arguendo*, that this were true, it is irrelevant because none of the subject cumulative projects could have been considered as future "development" projects at the time that the BAAQMD's CEQA thresholds were developed in 2009. They all have arisen as a result of the recent glut of cost-advantages crudes that are stranded at their source and thus must be imported into California via rail or marine vessel, replacing supplies that formerly arrived by pipeline. Thus, the emissions from all of them are in addition to the baseline scenario alleged to have been used to develop the significance thresholds.

The RFEIR's responses are silent as to our quantitative analysis of cumulative increases in annual and daily NOx and ROG emissions in our Tables 6 and 7, at RFEIR pp. 3.2-228/229. Our analysis demonstrates that cumulative NOx and ROG emissions would result in significant air quality impacts in other air basins, outside of the BAAQMD, from projects involving rail transport of crude through these basins.

Finally we note that Master Response 2.3 asserts that its approach to cumulative air quality impacts was agreed upon by the County and the BAAQMD and that the BAAQMD approved the results in Comment Letter A3. RFEIR, p. 2-14. The BAAQMD's opinion does not trump CEQA, as explained in companion legal responses prepared by ABJC on behalf of SAFER.

Comment B11-22: Cumulative GHG Impacts

The SAFER summary of our Comment IV.C (RFEIR, pp. 3.2-229/231) explains that when errors and omissions in the RDEIR's analysis are corrected, the Project increases GHG emissions, resulting in both a significant Project GHG impact and a significant cumulative GHG impact. We asserted increases in GHG would occur from increased sulfur removal, increased hydrogen production, and end uses of the recovered propane and butane. We also asserted significant cumulative GHG emissions from ten omitted projects. The RFEIR makes arguments in opposition.

First, the RFEIR admits that GHG emissions from the increase in electrical demand (1.28 MW) required to power the increases at the Sulfur Recovery Unit and

the new Hydrotreater were omitted and estimates them at about 2,002 MT/year. RTC B11-21. This estimate is unsupported.

Second, the RFEIR asserts that no additional hydrogen would be required for the new Hydrotreater as hydrogen is already present in the Refinery gas stream being hydrotreated. RTC B11-21. This is misleading. While it is certainly possible that the new hydrotreater could use hydrogen already present in the subject Refinery gas stream, this hydrogen would have been used in the baseline in other processes. The off-site Hydrogen Plant that supplies the Refinery's hydrogen demand would have to increase production to replace the internal hydrogen diverted to the Project's new hydrotreater. Thus, the Project will increase hydrogen production, indirectly, at the off-site Hydrogen Plant.

CEQA requires that all indirect impacts, such as from off-site hydrogen production and electricity generation, be included in Project impacts. Further, the assertion of no increase in hydrogen production contradicts admissions previously made by the County that hydrogen use would increase by 5 mmscd, emitting 43,000 MT/year of GHGs. RFEIR, p. 3.2-225.

Third, the RFEIR agrees that "it is an undisputed fact that the combustion of propane and butane generate GHG emission..." RTC B11-22 at p. 3.2-253. However, it argues that "quantification of such emissions... would require the use of assumptions that would be too speculative." The end uses are not speculative, but rather have not been disclosed by Phillips 66, as we explain in our responses to RTC B11-14. Further, all end uses generate GHG emissions. Thus, the County could have bounded the potential increase in GHG emissions from offsite uses by estimating a range, from the use that emits the lowest amount of GHG to the use that emits the highest amount. Dismissing GHG emissions from off-site use of the recovered propane and butane is indefensible.

Finally, the RFEIR's RTC B11-26 asserts that GHG impacts are "exclusively cumulative impacts" and thus need only be compared to the BAAQMD's significance threshold of 10,000 MT/year. RCT B11-22 at p. 3.2-253. However, as explained for criteria pollutants, even assuming, *arguendo*, that the RFEIR's legal interpretation is correct, the ten omitted projects were not considered when the BAAQMD GHG significance threshold was develop and thus are not subsumed in the significance threshold. See RTC B11-21.

Comment B11-23: Cumulative Hazard Impacts

The SAFER summary of our Comment IV.D (RFEIR, pp. 3.2-231/234) identifies six deficiencies in the hazard analysis, based on detailed analyses in our Comment III.D, RFEIR pp. 3.2-231/234. The RFEIR incorrectly asserts "[t]his comment summarizes issues raised in previous comments." RTC B11-25, p. 3.2-253. The hazard analysis in

the RDEIR was not included in the DEIR and thus previous comments did not address any of the new issues raised in our Comment Letter B11-25, Comment III.D. The RFEIR addresses some of the hazard issues we raised in Master Response 2.5.1, RFEIR, pp. 2-8/11.

First, we commented that the RDEIR underestimated hazards by assuming an increase of only 16 rail cars per day, instead of 24 per day. RFEIR, p. 3.2-231. Master Response 2.5.1(1) asserts "the potential risk from the baseline condition is at its maximum capacity not its average capacity and similarly the proposed Project's risk is also at its maximum capacity, *i.e.*, 24 tank cars per day." RFEIR, p. 2-8. This is precisely what we argued. We agree that the greatest risk is at the maximum increase in the number of rail cars. However, the hazard analysis is based on only 16 per day, not 24 rail cars. Thus, Master Response 2.5.1 has conceded that the hazard analysis underestimates hazards by using the incorrect number of rail cars.

Second, we argued that risks were underestimated by including only LPG releases. Master Response 2.5.1(2) argues that "[i]t would not be appropriate or accurate to include frequency data covering derailments, releases, etc. for other types of railcars or other types of materials into the analysis... because the tank car design are different for many types of commodities carried by rail..." RFEIR, p. 2-9.

The LPG would be transported in DOT 105 or 112 tank cars. These tank cars are used for many other hazardous materials, such as chlorine, ammonia, and ethylene oxide. Thus, at a minimum, all accidents involving releases from DOT-105 and 112 tank cars should have been included in the analysis. Further, the design of the tank car is not the only factor that determines the number of accidents that result in a release. The number of accidents depend on many other factors, including track conditions (*e.g.*, crossings, grade); the amount of rail traffic (*i.e.*, rail miles); and human factors. The RFEIR minimized hazard impacts by restricting its analysis to a tiny subset of relevant accident types.

Third, we argued that the probability analysis was based only on historic 1990 to 2010 LPG rail traffic accident data and that cumulative accident impacts due to the increase in LPG cars coupled with post-2010 traffic, which includes a significant increase in crude rail cars, was not evaluated and are significant. RFEIR, p. 3.2-232. Master Response 2.5.1(3) asserts, without citing any evidence, that the accident risk of transporting butane and propane is independent of other commodities carried on the subject rail lines. RFEIR, p. 2-9. This is the same argument used to rebut point two and is wrong for the same reason previously discussed. The risk of any accident depends on many things other than the commodity in the tank car. It depends directly on the amount of traffic using the rail line, the condition of the track, and human error. Our point here is that there will be much more rail traffic in the future, due to the huge

surge in moving crude by rail. More trains on the tracks means a greater risk of accident.

Fourth, we argued that the accident analysis was based only on the short segment of track from the Richmond Yard to the Refinery, pointing out that other route segments contain many high hazard areas for derailments. RFEIR, p. 3.2-233. Master Response 2.5.1(4) argues that the release frequency of 1.04E-8 releases per mile "is representative of the tank car release frequency of propane or butane in the United States... not based on any particular stretch of track, but on a compilation of all tracks. RFEIR, p. 2-9. This nationwide average frequency would significantly underestimate release frequency in California, as its rail lines are in poor repair and include many high hazard areas where derailments are much more common than the national average.

Fifth, we argued that the RDEIR did not establish any significance threshold for its hazard analysis and cites no authority for concluding accident impacts are not significant. RFEIR, p. 3.2-233. Master Response 2.5.1(5) argues that CEQA does not cite any acceptable significance criteria for hazard analysis states the Santa Barbara Guidelines do not specifically address rail risk. RFEIR, p. 2-10.

CEQA does not cite acceptable significance criteria for any impact area. The lead agency selects appropriate significance criteria. In this case, the County has failed to fulfill its duty. Further, Santa Barbara Guidelines are general guidelines, applicable to any source of risk, including rail risk. They are relied on by Phillips 66 in the Rail Spur RDEIR, Figures 4.7-5, -6, and -7.

Finally, Master Response 2.5.1(5) asserts that in any case, the Project does not add any train traffic to existing rail lines and would therefore not increase the hazard profile. RFEIR, p. 2-10. As noted in our response to RTC B11-20, butane exports are seasonal. The record does not disclose daily butane train traffic from the Refinery and the RFEIR does not require that there be no increase in the number of daily butane trains. Historically, the export of butane has been seasonal to serve the gasoline market, with high exports in the summer when butane must be removed from gasoline to meet ROG regulations and low exports in the winter when butane can be blended into gasoline. Thus, it is plausible that there are days when no butane trains would leave the Refinery in the baseline. The Project, on the other hand, would likely export LPG every day, as it is serving a year-round market.

Fox/Pless Comment V: Health Risk Impacts Are Underestimated and Significant

We commented in our Comment V that health risks from Project operational emissions were underestimated and significant. RFEIR, pp. 3.2-234/237. SAFER

summarized our comments in Comment B11-18. The RFEIR responds at RTC B11-18 to nine issues that we raised. RFEIR, pp. 3.2-249/251.

We explained in our comments that the health risk assessment ("HRA") provided by the RDEIR is substantially flawed. The RFEIR does not directly respond to our comments, but rather only to SAFER's summary comments at RTC 11-18. We discuss below seven of these nine points that are not adequately resolved by the RFEIR's response. As we misnumbered the points in our comment letter, we follow the numbering used in the RFEIR's responses.

In the first point, we commented that the RDEIR's health risk assessment only identifies the Maximum Exposed Individual Receptor ("MEIR") and the Maximum Exposed Individual Worker ("MEIW") but fails to identify the Point of Maximum Impact ("PMI"). RFEIR, p. 3.2-235. The RFEIR's response at RTC 11-18(1) states that the MEIR and MEIW were identified "because these locations represent the locations of maximum risk."

This response is incorrect and misses the point. The PMI is just that, the point of maximum impact, not the point of maximum risk to existing receptors, and it is not necessarily located at the same point as the MEIR or MEIW. In fact, review of the modeling files shows that health risks at the PMI are higher (*e.g.*, boiler scenario: acute hazard index of 0.099 at UTM 566,404E, 4,211,397N) than the maximum health risks reported by the RDEIR (Table 4.1-11 boiler scenario: acute hazard index 0.047 at MEIW).

Information about the location and health risks at the PMI is routinely included when reporting the results of health risk assessments, in addition to the MEIR and MEIW. Further, this information is a required component of health risk assessments. *See*, for example, the guidance developed by the California Association of Air Pollution Control Officers ("CAPCOA"), *Health Risk Assessments for Proposed Land Use Projects;*[4] by the Office of Environmental Health Hazard Assessment ("OEHHA"), *Air Toxics Hot Spots Program Risk Assessment Guidelines – The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments;*[5] and by the OEHHA, the California Air

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[4] CAPCOA, *Health Risk Assessments for Proposed Land Use Projects*, July 2009; http://ca-contracostacounty.civicplus.com/DocumentCenter/View/28311. (p. 69: "If a fence line receptor point does not represent an existing or reasonably anticipated person, it is not necessary to consider these results to determine the Maximum Exposed Individual (MEI), but fence line exposure should be considered to determine the Point of Maximum Impact (PMI)." p. 70: "The receptor grid must be designed to include the Point of Maximum Impact (PMI)." p. 7): "It is the responsibility of the modeler to demonstrate that the PMI has been identified and that the modeling includes all areas where Hazard Indices are above one, and the cancer risk is above ten per million, or other district standards.")

[5] OEHHA, *Air Toxics Hot Spots Program Risk Assessment Guidelines – The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, Public Review Draft, September 2014; http://oehha.ca.gov/air/hot_spots/2014/SRP2014/SRPReviewSept2014GuidanceManual.pdf. (pp. 4-20

Resources Board ("CARB"), and local air districts, *Standardized Forms for Use with Submittal of Updated and Screening Health Risk Assessments.*[6] While the RDEIR claims to follow the first three guidance documents, it fails to include the location and health risks at the PMI as recommended by these documents. Thus, the RFEIR fails to adequately respond to our comments and fails to show that the HRA accurately discloses health risks from the Project.

In the fourth point, we commented that the health risk assessment for locomotive emissions fails to account for "idling" emissions from operation of the on-site switching locomotive. RFEIR, p. 3.2-235. In response, the RFEIR at RTC B11-18(4) states that the "locomotive HRA conservatively assumes that 100 percent of the proposed Project's locomotives travel would take the northern route and 100 percent would take the southern route. In both directions, the emissions include large and small line haul and switch emissions. Therefore, the HRA is conservative." This statement is entirely non-responsive as it only addresses emissions from locomotives in transit and fails to address emissions from idling locomotives.

In the fifth point, we commented that the health risk assessment for locomotive emissions fails to account for "increased" idling emissions from operation of the on-site switching locomotive. RFEIR, p. 3.2-235. In response, the RFEIR asserts "There is no validity to the argument that the proposed Project would increase idling of haul locomotives." RFEIR, p. 3.2-250, RTC B11-8(5). This is evidentially intended as the response to the fourth point, which deals with idling emissions from haul locomotives.

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and 4-21: "The modeling analysis should contain a network of receptor points with sufficient detail (in number and density) to permit the estimation of the maximum concentrations. Locations that must be identified include the maximum estimated off-site impact or point of maximum impact (PMI), the maximum exposed individual at an existing residential receptor (MEIR), and the maximum exposed individual at an existing occupational worker receptor (MEIW)... All of these locations (i.e., PMI, MEIR, and MEIW) must be identified for potential multipathway carcinogenic and noncarcinogenic effects... In addition to actual UTM coordinates, the block/street locations... should be provided in the HRA for the PMI, MEIR, and MEIW for carcinogenic and noncarcinogenic health effects." p. 9-10: "The point of maximum impact (PMI), maximum exposed individual at a residential receptor (MEIR), and maximum exposed individual worker (MEIW) for both cancer and noncancer risks should be located on the maps.") The same language appears in the adopted version of the document: OEHHA, *Air Toxics Hot Spots Program Risk Assessment Guidelines - The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, August 2003; http://oehha.ca.gov/air/hot_spots/pdf/HRAguidefinal.pdf.

[6] OEHHA, CAPCOA, and CARB, Memorandum to District Air Toxics Coordinators, Standardized Forms for Use with Submittal of Updated and Screening Health Risk Assessments; http://www.arb.ca.gov/ab2588/hraforms.pdf. (Multiple references to "PMI" as one of the required parameters for HRAs and Attachment B: "The potential health impact must be calculated for the point of maximum impact (PMI) or maximum off site concentration.")

The fifth point deals with idling emissions from the on-site switching locomotive, which is not addressed in RTC B11-18. However, elsewhere, the RFEIR agrees the Project would increase idling, from 1 hour prior to the Project to 2 hours, assuming an increase of 12 additional rail cars. RFEIR, p. 3.2-246. However, as we note above in our response to RTC B11-14, the Project would require 20 additional rail cars, not 12. Thus, the RFEIR underestimates the increase in idling time. As the health risk assessment did not include any increase in idling time, from on-site switching or off-site hauling, it underestimated health risks from diesel particulate matter ("DPM") emissions from idling locomotives.

In the sixth point, we commented that the RDEIR's incremental cancer risk from increased concentrations of diesel particulate matter in ambient air due to increased locomotive emissions suffers from the same problems as the RDEIR's estimates of criteria pollutant emissions from locomotives. Specifically, concentrations of DPM in ambient air were modeled based on annual emissions estimates. As discussed in section III.B.2 of our comments on the RDEIR (RFEIR, pp. 3.2-207/209), for criteria pollutant emissions, the RDEIR substantially underestimates annual LPG exports and the number of rail cars loaded on an annual average basis. Consequently, the RDEIR underestimates locomotive emissions by a factor of 1.36.[7] Therefore, the RDEIR's estimate of incremental cancer risks at the MEIR (1.7 in one million) due to Project increases in locomotive DPM emissions is 2.31 in one million (1.7 in one million × 1.36). Note that this revised estimate does not account for increased idling on site or nearby.

In response, the RFEIR at RTC B11-18(6) states that locomotive emissions were not underestimated based on RTC B11-12, RTC B11-13, and RTC B11-14 and, therefore, incremental cancer risks were not underestimated. However, the RFEIR's responses to comments B11-12, B11-13, and B11-14 are directed at SAFER's summaries of underlying detailed analyses. These responses fail to address substantial evidence in our underlying comment letter labeled B11-25, which was not responded to at all. Our comment letter (B11-25) proves that the RFEIR underestimated locomotive emissions. Thus, incremental cancer risks due to DPM *were* underestimated.

In the seventh point, we commented that the RDEIR's health risk assessment does not account for cancer risks associated with increased emissions of benzene due to a switch to Bakken crudes, which contain considerably higher amounts of benzene than the baseline crude slate. In response, the RFEIR at RTC B11-18(7) claims that the Project does not involve the use of Bakken crudes. This claim is rebutted in our Comments II.B and II.C, which the RFEIR did not respond to. RFEIR, pp. 3.2-194/198.

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[7] Calculated as: (revised annual emissions)/(RDEIR annual emissions). For example for NOx: (13.85 tons/year)/(10.18 tons/year) = 1.36.

Our Comment II.C, for example, proves that the Marine Terminal modifications are designed to allow the import light crudes, such as Bakken crudes, which have very high concentrations of benzene. The RFEIR does not respond to our Comments II.B and II.C, but rather only responded to SAFER's summary. The response to the summary does not address any of the substantial evidence we presented that prove the Project, in fact, would recover propane and butane from Bakken and other light crudes that contain elevated benzene levels. *See* above: "Fox/Pless Comment II. The Project Is Piecemealed."

In the eighth point, we commented that the RDEIR's analysis of cancer risks from existing sources at the Rodeo Refinery (5.95 in one million at the MEIR), which is part of the RDEIR's cumulative health risk assessment, does not include emissions from mobile source or exempt sources and, thus, health risks associated with those sources are not accounted for. In response, the RFEIR at RTC B11-18(8) admits that the "refinery piece of the HRA does not address mobile source emissions." With respect to mobile sources, the RFEIR notes that "the cumulative HRA included the proposed Project, the existing Phillips 66 Refinery, along with locomotives operating on the rail line and transportation sources on Highway 80." The RFEIR is silent with respect to exempt sources and mobile on-site sources. Thus, we maintain that the cumulative health risk assessment is flawed because it does not account for emissions from these sources.

In the ninth point, we commented that the RDEIR's estimates of PM2.5 concentrations due to increases in locomotive emissions suffer from the same problems as those for criteria pollutant and DPM emissions. Further, we commented that the RDEIR omitted several sources of PM2.5. When these errors and omissions are corrected, ambient PM2.5 concentrations exceed the PM2.5 significance threshold of 0.8 $\mu g/m^3$, resulting in a new significant impact. RFEIR, pp. 3.2-236/237.

The RFEIR at RTC B11-18(9), responding only to SAFER's summary of our comment, complains that no documentation was provided for this estimate. This is incorrect. Our comments at RFEIR, pp. 3.2-236/237, which the RFEIR failed to respond to at all, clearly explain and document based on substantial evidence that our revised PM2.5 concentration of 0.749 $\mu g/m^3$ was calculated from the RDEIR's estimate of 0.739 $\mu g/m^3$ plus an additional 0.01 $\mu g/m^3$ based on correcting errors in the RFEIR's estimate of locomotive emissions.

Response B11-18(9) also asserts that 0.749 $\mu g/m^3$ rounds to 0.7 $\mu g/m^3$ which is less than the PM2.5 significance threshold. However, we reported our results to the wrong number of significant figures. The increase in PM2.5 from correcting the RFEIR's

locomotive emissions error is 0.015 $\mu g/m^3$,[8] not 0.01 $\mu g/m^3$. When 0.015 $\mu g/m^3$ is added to the RFEIR's estimated increase in PM2.5 of 0.739 $\mu g/m^3$, the revised PM2.5 increase is 0.754 $\mu g/m^3$, which rounds up to 0.8 $\mu g/m^3$ and is equal to the PM2.5 significance threshold. Thus, any further increase tips PM2.5 over the significance threshold. The RFEIR's analysis omitted several sources of PM2.5 emissions, such as idling emissions, resulting in a *per se* significant PM2.5 impact.

We further commented that other sources of PM2.5 were omitted from the RDEIR's PM2.5 calculations, including fugitive dust PM2.5 emissions associated with locomotive and other mobile source travel plus exhaust PM2.5 emissions from mobile sources within the Refinery and exempt sources. Response B11-18(9) indicates that some exempt sources were included, but is silent as to fugitive dust from train travel and sources within the Refinery. Further, the RFEIR's calculations exclude increases in PM2.5 from increased emissions at the Sulfur Recovery Unit and the off-site Hydrogen Plant, as documented in our Comment III.E, at RFEIR pp. 3.2-224/225.

These omitted sources when added to 0.8 $\mu g/m^3$, regardless of their magnitude, exceed the BAAQMD's significance threshold for this pollutant as any increase tips the concentration over the threshold of 0.8 $\mu g/m^3$. Thus, we re-assert that PM2.5 emissions are a new significant impact that must be identified and mitigated in a revised RDEIR for the Project.

Finally, we recommend that the County revise the maps showing the Project and cumulative health risk assessments to include isopleths for health risks in addition to the PMI, MEIR, and MEIW to identify those locations that would exceed the BAAQMD's health based thresholds of significance.

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[8] Increase in PM2.5 ambient concentration from correcting RFEIR's errors in locomotive emissions: $0.042 \times 1.36 - 0.042 = 0.015\ \mu g/m^3$.

Santa Maria goes, via their 200-mile pipeline, *directly* into P66's Rodeo coker unit, that only processes heavy crude.

Note: The Tar Sands bitumen is so dense and heavy, it is literally a solid, that must be diluted with 30% light weight petroleum solvents in order to liquify it and it is, thus, called DilBit.

Per Greg Karras' peer-reviewed published research: DilBit takes 2-3 times the energy to refine as typical or traditional crude. Additionally, it is well known to have unusually high amounts of toxic heavy metals (like nickel and vanadium) and it produces far more Petroleum Coke (PetCoke) than lighter crudes. According to Karras and others, coking it violently (at around 900 degrees Fehrenheit) for a day or so produces lots more propane than would less aggressive refining of traditional crude oil, hence part of the reason for the propane recovery project is to recover the extra or excess propane. P66 has a nearly one billion dollar contract deal with the Chinese company SinoPec for propane delivery ($850 million).

P66 in Rodeo according to a recent EPA document, is the most polluting refinery in California. The brief, unreferenced document did not break down particular pollutants or whether the pollutants are airborne or water born.

Not stated in my EIR comment letter: It should be noted that P66 in Rodeo has a "Nelson Complexity Index" of 13.6, one of the highest in the world and the highest in the U.S., indicating that the refinery is unusually complex and valuable, exactly because it has a dedicated capability of refining the heaviest, least expensive crudes in order to produce the highest valued products, such as gasoline.

Best Regards,

Charlies Davidson
(510) 837-8441

EIR COMMENT SUBMITTAL:

Phillips 66 Rodeo and Santa Maria Refineries Expansion of Combined Production

Capacity, Tar Sands Refining Capability and Propane Production

The first major problem with Phillips 66's Santa Maria Railroad Spur Extension Project Recirculated Draft Environmental Impact Report (RDEIR; 1), is that it is a piecemealed project since the Santa Maria Refinery is connected by a 200-mile pipeline to the San Francisco Refinery in Rodeo. In turn, the Rodeo Refinery accepts heavy gas oil derived from semi-refined Santa Maria heavy crude feedstock and then completes the refining processes in order to make higher-valued products, such as gasoline, diesel and jet fuel. Concurrently, a Rodeo Refinery RDEIR is proposing the Propane Recovery Project (1). Multi-project EIR piecemealing is illegal in California under CEQA.

A second major problem with Phillips 66's Santa Maria Refinery Railroad Spur Extension Project RDEIR is that it fails to disclose the fact that the refineries' most likely source of crude oil would be a type of high-sulfur, extra heavy crude oil derived from Canadian Tar Sands, called bitumen. Specifically, Phillips' RDEIR states that light, low-sulfur "sweet" Bakken North Dakota crude oil would be an "excluded" type of refinery feedstock carried by rail into Santa Maria, leaving Tar Sands bitumen as the only other "crude-by-rail" available in large enough amounts. (2) The combined Santa Maria-Rodeo Refinery Projects' dependence on energy-intensive bitumen refining would make them, cumulatively, high greenhouse gas-producing projects that are capable of emitting increased amounts of toxic pollutants and a large excess of highly flammable propane. – Charles Davidson. Dec. 2014

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Greg Karras from Communities for a Better Environment (CBE) and Refinery Engineer Phillis Fox, from Shute, Mahaley and Weinberger, have critiqued these disparate Phillips 66 EIRs, authored by Environmental Science Associates, for both their Santa Maria Refinery and Rodeo Refinery. Karras and Fox have established that the separate projects are inherently interrelated and interdependent and they each have done a cumulative analysis for these collective Phillips 66's projects.

Large amounts of partially refined diluted Tar Sands bitumen, i.e. DilBit, will be sent by a 200-mile pipeline to the Rodeo refinery, that is undergoing the Propane Recovery Project. The Santa Maria Refinery is planning two projects, the Rail Spur Extension (CBR) Project and the Throughput Increase Project.

The Rodeo Refinery will finish off the refining of the heavy gas oils sent from Santa Maria in order to create high valued products such as gasoline, diesel and jet fuel. Aggressive refining of bitumen produces large amounts of propane. DilBit dilutent has a large amount of lightweight hydrocarbons, like propane, as well as butane and pentane,

which together are over 7% by weight of DilBit and a much larger percentage by volume.

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1) Executive Summary; Phillips SMR Rail Project Recirculated Draft Environmental Impact Report RDEIR. October 2014 ES-5.

2) Phillips 66 Propane Recovery Project RDEIR - SCH# 2012072046 and Phillips 66 Santa Maria Refinery Company Rail Spur Extension Project (RDEIR) – SCH# 2013071028

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The Santa Maria and Rodeo EIRs were illegally piecemealed and in their EIRs Phillips tried to obfuscate the real source of the crude, that will be DilBit, like the EIR's authors imagining a crude influx for some other domestic sources that have dwindle markedly in recent years and decades, like California inland and offshore crudes. Alaska crude has also dwindled in recent decades since its peak, when it was a primary source in-state refinery crude feedstock. These types of domestic crudes are not a practical option in the Santa Maria crude-by-rail expansion project,

The Santa Maria rail spur extension project declares that their will absolutely be no Bakken crude delivered, i.e. that Bakken was explicitly "excluded", so the only other practical option for delivery by rail is also the most likely rail delivery, being DilBit from Alberta, Canada. To accommodate the fact that DilBit weights much more per barrel and per railroad per tank car than traditional crudes, the RDEIR states that there will be 13 percent less crude within each tanker due to weight limits. The RDER also states that there will be heaters available, that would only be the case should the heavy bitumen in the DilBit separate from the diluent during transportation.

CBE noted that the proposed 10 percent increased processing capacity of the Santa Maria Refinery would indicate real total capacity of about 1 train per day or 344 trains/year, while Phillips' "RDEIR provides no data supporting its "expected" maximum of 250 trains/year".

The 200-mile pipeline goes directly into the Rodeo Refinery's coker, which processes the heaviest portions of crude and heavy gas oils. The coker produces a solid, heavy-metal-laden toxic byproduct, called petroleum coke or PetCoke, that is exported to China and India to burn in place of coal in order to make electricity. High-temperature coking and high-pressure hydro-cracking of the heaviest oils in Rodeo will make a lot of propane and butane, that are sold as Liquified Petrolem Gas or LPG.

The excessive yield of propane recovered will be both from that portion of propane produced by refining extra-heavy DilBit and also by the accumulation of propane-laden DilBit diluent. The Rodeo Refinery currently uses propane and butane to operate their refinery. Phillip's plan is to convert the refinery to operating with a large increase in piped-in natural gas, purchased from PG&E.

Phillips has signed a multi-year $850 million dollar contract with the Chinese company, SinoPec, for exporting LPG to China, that would lock Phillips 66 into refining the heaviest crudes. The excess propane generated under this DilBit refining scenario might indicate that the propane must be removed, lest the refinery blow up due to unbalanced thermodynamics. - Charles Davidson. Hercules CA. Dec. 2014

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February 2, 2015

Chair Giola and Members of the
Contra Costa County Board of Supervisors
651 Pine Street, 1st Floor, Room 106
Martinez, CA 94553
clerkoftheboard@cob.cccounty.us

Re: Phillips 66 Propane Recovery Project and Recirculated Draft Environmental Impact Report (County File Number LP12-2073)

Dear Chair Giola and Members of the Supervisors:

We submit this letter on behalf of the Rodeo Citizens Association ("RCA") to urge you to deny the proposed Phillips 66 Propane Recovery Project ("Project") because the Recirculated Environmental Impact Report ("REIR") for the Project fails to comply with the requirements of the California Environmental Quality Act ("CEQA"), Public Resources Code § 21000 *et seq.* and the CEQA Guidelines, California Code of Regulations, title 14, § 15000 *et seq.*) ("CEQA Guidelines"). As you know, this firm has submitted comments on the prior versions of the environmental document for this Project.[1] While we recognize and appreciate the REIR addresses certain of the comments made by this firm and other commentators, it still falls far short of complying with the requirements of CEQA. The EIR remains thoroughly inadequate, and cannot support approval of the Project. Unless a new draft EIR is prepared and recirculated, any approval of the Project will be unlawful.

I. The EIR Fails to Identify, Analyze, and Mitigate the Project's Increase in Greenhouse Gas Emissions.

The EIR concludes the Project would decrease greenhouse gas ("GHG") emissions by 43,603 metric tons per year ("MT/year"). RDEIR, Table 4.5-3 and RFEIR at 3.2-31. As we have explained, a reduction in GHG emissions would only occur if the propane

[1] The letters submitted by this firm on behalf of RCA on the EIR dated August 9, 2013, November 18, 2013, November 22, 2014 and December 5, 2014, together with any and all exhibits and attachments thereto, are hereby incorporated by reference.

and butane are not used elsewhere. The proposed Project just moves the location where the emissions will occur. GHG emissions are global pollutants, widely recognized as being cumulatively significant. Anywhere GHG emissions are released should be counted for determining the Project's impacts. The increase at the new location is a direct consequence of their removal at the Refinery. Inasmuch as the EIR actually acknowledges that the combustion of propane and butane as a fuel source would result in GHG emissions (RDEIR at 4.5-13), it must make a reasonable attempt at determining how the propane and butane would be used and calculate the expected emissions that would result from this use. To simply ignore these emissions grossly understates the Project's effect on climate change.

II. The EIR Fails to Identify, Analyze, and Mitigate the Project's Increase in Criteria Air Pollutant Emissions.

The EIR continues to erroneously conclude that the Project will not have significant air quality impacts. The EIR's error is that it substantially underestimates the Project's increase in criteria air pollutant emissions in at least three ways. First, the EIR takes credit for nitrogen oxide ("NOx") emission credits that occurred in connection with the shutdown of process heater B-401. The EIR asserts that after offsetting the emission increases from Phillip 66's marine terminal project, there are nearly 11 tons per year of NOx offsets available that will be used to offset the NOx emissions from the proposed Project. RFEIR at 3.2-32. Because the shutdown of this heater would occur whether this Project is realized or not, the inoperable equipment becomes part of the baseline emissions (*i.e.*, currently zero for this piece of equipment).

Moreover, offsets are emissions in one place that can be used to compensate for emissions elsewhere. By purchasing an offset, one is essentially paying someone else to reduce their emissions. In other words it is a market-based approach to regional, or even statewide emission reduction. By proposing to use the offset credits from a prior project, Phillips 66 is making no attempt to reduce on-site emissions from the Project. As the Attorney General explained in the context of the WestPac Project,

> offsets might reduce air pollution in California or the general region (depending on where actual reductions take place), they will not reduce the localized air pollution impacts in the community where the Project is located. Stated simply, the mitigation does not match the impact. To address the specific local impacts identified, CEQA requires that the RDEIR

> analyze – and the Project should be required to achieve – all feasible emission reductions of localized air pollutant on-site first. *See* Letter from Janill Richards to Kristin V. Pollot, January 15, 2015, submitted under separate cover.

For these reasons, offsets cannot be used as mitigation for the proposed Project. The increase in the EIR's estimate of both daily and annual NOx emissions exceed the Bay Area Air Quality Management District ("BAAQMD") significance thresholds of 10 tons/year without the process heater B-401 emission reductions and are, thus, significant unmitigated impacts of the Project. [2]

Second, the EIR underestimates the Project's locomotive-related emissions because it substantially overstates locomotive baseline emissions. The EIR calculates the Project's increase in locomotive emissions based on existing locomotive emissions. Yet these baseline emissions are substantially overestimated because they rely on an incorrect assumption regarding the number of existing rail cars and volume of liquefied petroleum gas ("LPG") exported during the baseline years. RDEIR Table 3-3 states that the average number of railcars will increase from 8 to 12 per day to 16 to 20 per day, a net increase of 8 per day. RDEIR at 3-39. Yet, as the December 5, 2014 Fox Report makes clear, the average number of railcars loaded for the past three years is only *four* per day. Fox Report, December 5, 2014, at 21 and RDEIR, Appendix B at 6. Annual Project increases in locomotive NOx emissions (13.9 tons/year) will be substantially higher (3.7 tons/ year) than estimated in the EIR. Fox Report at 19. This increase far exceeds the BAAQMD significance threshold of 10 tons/year. Courts have held that agencies must normally use existing conditions as the baseline for determining whether a project will have significant impacts. Agencies may depart from the norm of using existing conditions as a baseline only if substantial evidence demonstrates that an analysis based on existing conditions would be misleading or without informational value. The County has made no such showing here, nor could it since evidence in the record clearly shows that Phillips 66 has loaded only four rail cars per day for the past three years. RDEIR, Appendix B at 6. Its

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[2] Even assuming Phillips 66 is able to rely on the NOx offsets to reduce Project-related emissions to less than significant levels—which as we explain, it cannot -- as the Fox Report makes clear Phillips 66 has only 0.73 tons/year of NOx emissions credits available rather than the 10.8 tons/year Phillips 66 assumes. *See* Fox Report at 27, 28. Consequently, the NOx emissions from the Project would still exceed the BAAQMD significance threshold of 10 tons/year and is thus a significant impact.

use of an inflated baseline is thus improper and leads to the incorrect conclusion that the Project will have no significant air quality impacts.

Third, the EIR further underestimates the Project's locomotive -related NOx emissions because it only quantifies the increase in emissions from within the BAAQMD boundaries. The EIR asserts that the evaluation of emissions outside of the San Francisco Bay Area is outside the scope of the EIR because defining such emissions that could be generated within the various air basins would require the use of overly speculative assumptions. RFEIR at 3.2-33. This is incorrect. The County knows exactly how many locomotives per day would be in use by Phillips 66, the amount of emissions these trains generate, and the precise rail tracks these locomotives would travel. Indeed, the EIR conducted this exact analysis for GHG emissions. *See Id.* at 3.2-32 stating that " the RDEIR represent[ed] those emissions that would be generated within the BAAQMD *as well as those that could be generated within other areas of California...* " (emphasis added).

As a result of the numerous deficiencies in the EIR's air quality analysis, it incorrectly determines the Project would not result in a significant increase in NOx emissions. Consequently, the EIR also unlawfully fails to include any mitigation for these significant air quality impacts.

III. The EIR Fails to Identify, Analyze and Mitigate the Project's Potential to Create a Hazard to the Public or Environment Thorough Reasonably Foreseeable Upset or Accident.

The EIR erroneously concludes that the potential hazards associated with the Project would be less than significant because there is a "low probability" that an accident would happen. *See DEIR at 4.9-22 and* RFEIR at 2-7. The error from such an approach is obvious. While the probability of any specific accident may in fact be low, or even very low, accidents nevertheless occur.

As the EIR prepared for the WestPac facility explains, despite the low probability of accidents, "industry-wide experience shows that releases from bulk storage tanks will continue to occur in statistically low frequency events." *See* WestPac Pittsburg Energy Infrastructure Project RDEIR, Hazards and Hazardous Materials chapter, July 2013 at 10.0-32, attached as Exhibit A. Unlike the Phillips 66 EIR, the WestPac EIR actually analyzes the types of accidents that have the possibility of occurring (e.g., releases from bulk storage tanks, pipelines and railcars), the reasons for these accidents (e.g., fire,

equipment failure, human error, and natural disasters), and describes the likely severity of the events (e.g., minor release, major release, complete tank failure). *Id.* The WestPac EIR then takes the most important steps which are to disclose the potential impact (e.g., a crude oil release from a train accident with the potential for significant impacts to sensitive resources; thermal flux can cause discomforting heat and redness of the skin, etc.) and identifies the measures that would be taken to attempt to protect the public and the environment. *Id.* at 10.0-31—60.[3]

Other lead agencies apparently recognize the requirement to thoroughly analyze the potential for refinery-related projects to increase exposure to hazards and hazardous materials. An EIR prepared for another Phillips 66 project (Santa Maria Refinery ("SMR") Rail Spur Project) in San Luis Obispo County included a comprehensive analysis of human safety impacts based on commonly accepted industry standards. *See* Phillips SMR Rail Spur Project Draft EIR, November 2013, Hazards and Hazardous Materials chapter, attached as Exhibit B. The SMR Rail EIR included a quantitative risk assessment which identified release scenarios, developed frequencies of occurrence for each release scenario, determined consequences of each release scenario, developed estimates of risk, including risk profiles and developed risk-reducing mitigation measures. *Id.* at 4.7-3. Unlike the Phillips Rodeo Project EIR, the SMR Rail Spur EIR developed population density information for each receptor which included the number of persons present at each location, the area over which the persons are distributed, the maximum number of persons that could be exposed, the number of hours per day that persons are at the location, and an ignition probability (which defines the probability that a flammable cloud, for example, would reach the receptor and ignite and affect the receptor location). *Id.* at 4.7-5. The end products for the serious injury and fatality analysis are "risk profile" curves, one for fatalities and one for serious injuries, developed from the scenario frequencies and effected populations for each scenario. *Id.* This is the type of analysis that is omitted from the Phillips Rodeo Project EIR.

Another fatal flaw in the Phillips Rodeo Project EIR is its erroneous conclusion that the Project would have a less than significant impact on the Bayo Vista Child Development Center which is located within one-quarter mile of the rail spur on which the Project's propane rail cars would be staged. Notwithstanding its significance threshold stating that a project would cause adverse impacts related to hazards and

[3] While the WestPac EIR identifies certain mitigation measures intended to reduce the Project's hazards' impacts, it is our opinion that these measures do not appear to be anywhere sufficient to protect the environment or members of the public.

hazardous materials if it would emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of a school (at 4.9-13), the EIR concludes that impacts to the Child Development Center would be less than significant. *Id.* at 4.9-1, 14. Such a conclusion is absurd particularly because the EIR acknowledges that an incident affecting an LPG-filled rail car could pose a risk to this location. *Id.* Despite this acknowledgment, the EIR concludes, absent any evidence, that the baseline risk already exists, there would be no change in risk, and therefore no impact. *Id.* This is incorrect. While it is true that the rail spur is currently used for staging butane rail cars, propane-filled rail cars would be staged at this rail spur as a result of the proposed Project. In addition, whereas the average number of railcars loaded for the past three years is only *four* per day (RDEIR, Appendix B at 6), the average number of railcars at this location will increase up to 20 per day. RFEIR at 3.2.32. This increase in activities involving hazardous materials located a mere 0.2 miles from a child care center constitutes a significant impact for which no mitigation has been identified.

As regards rail-related accidents, the EIR concludes that despite the additional butane/propane railcar shipments per day from the Refinery, there would be no added risk of train accident. DEIR at 4.9-17 – 19. The EIR asserts that "frequency of rail accidents is computed on a per-train basis, not a per railcar basis." *Id.* The EIR provides no evidence to support this conclusion. Moreover, there is ample documentation demonstrating that train length is an important factor in derailments in that a longer train is more likely to derail. *See* "Analysis of Major Derailment Causes on Heavy Haul Railways in the United States, X. Liu, et.al., attached to our November 18,2013 letter on the DEIR. Other studies confirm that the likelihood that a train will be involved in an accident is a function of both train-miles and car-miles operated. *See* Derailment Probability Analyses and Modeling of Mainline Freight Trains, R. Anderson and C. Barkan, attached as Exhibit C. As this study explains, car-mile related causes are those for which the likelihood of an accident is proportional to the number of car-miles operated,

> The probability that an accident will occur is then a summation of the number of train-miles multiplied by the train-mile accident rate and the number of car-miles multiplied by the car-mile accident rate. Thus, it follows that longer trains have an increased likelihood of having an accident due to a larger number of car-miles of exposure. *Id.*

To comply with CEQA, the County must actually evaluate the numerous factors that could result in increased possibility of train derailments. These include, for example, train length, typical train speeds, condition of the tracks, number of at-grade crossings, shared tracks, increased numbers of trains etc. We also urge the County to consult with the Federal Railroad Administration as it maintains records of rail accidents that provide data to evaluate the probability of a release of crude oil during rail transport. *See* WestPac EIR at 10.0-56.

Finally, the claim that the County is precluded from addressing impacts associated with rail service to the facility is not correct. *See* RFEIR at 2-4. The reference in the EIR to a recent appellate decision presumably refers to *Friends of the Eel River, et al. v. North Coast Rail Authority.* However, the Supreme Court recently granted review in this matter and it is no longer citable as precedent. Moreover, the decision in *Town of Atherton v. California High-Speed Rail Authority* (2014) 228 Cal.App.4th 314 – which specifically rejected the argument that the Interstate Commerce Commission Termination Act preempted application of CEQA to the High Speed Rail line – remains good law. In any event, RCA is not asking the County to regulate rail traffic but to address all of the impacts associated with the expansion of the Phillips 66 facility and to mitigate those impacts to the extent feasible. The County cannot avoid an analysis of the impacts of the Project simply by claiming it would be infeasible to address them. *Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 48 Cal. 4th 310, 324-325 (rejected claim by oil refinery that infeasibility of mitigation excused failure to evaluate project's impacts.)

As a result of the numerous deficiencies in the EIR's hazards and hazardous materials analysis, it incorrectly determines the Project would not result in a significant risk to public safety. Consequently, the EIR also unlawfully fails to include any mitigation for these significant impacts.[4]

[4] Moreover, because the Project would result in significant and unmitigated hazards, air quality, and GHG impacts, the County cannot make the required findings under the zoning code requirements to grant a land use permit for the Project. Contra Costa County Ordinance section 26-2.20008. Consequently, no use permit may be issued.

IV. The EIR Fails to Adequately Analyze the Project's Cumulative Environmental Impacts.

Despite our repeated requests that the EIR analyze the Project's cumulative environmental impacts, the EIR ignores the effects from several other projects and wrongly concludes the Project's cumulative impacts would be less than significant. The EIR suggests that its cumulative impact analysis is a combination of a plan-based and a list-based approach. RFEIR at 2-11. Yet, we could find no evidence in the record that either of these approaches actually includes an analysis of the environmental impacts that would result from the proposed Project together with other projects.

A. Plan-Based Approach

CEQA allows a planned based approach to cumulative impact analyses but requires that the EIR include a summary of projections contained in the applicable plans that describe or evaluate conditions contributing to the cumulative effect. CEQA Guidelines 15130 (b)(1)(B). Here, the EIR does no such thing; it simply asserts that "from a plan-based perspective, the technical analyst for each resource area considered the Project in light of its consistency or conflict with the assumptions and projections of the Contra Costa County General Plan and other applicable planning documents identified in Section 5.4.1."[5] *Id.* at 2-11,12.

RCA is particularly concerned by the Project-related and cumulative air quality, GHG emissions and hazards impacts. Consequently, we reviewed the applicable plans cited by the EIR to determine whether they in fact acknowledged these other projects and conducted the appropriate impact analyses. For example, the County General Plan does not even contain the terms "air quality" or "air pollution" so we question how the General Plan evaluates cumulative air quality impacts. Nor does the County General Plan even include the words "Phillips 66" or "refinery." The Contra Costa County Hazardous Materials Area Plan mentions Phillips 66 but only in the context of emergency calling

[5] The EIR purports to have relied on, in addition to the Contra Costa County General Plan, the Contra Costa County Hazardous Materials Area Plan, the Contra Costa Congestion Management Plan, the Contra Costa Clean Water Program, the Bay Conservation and Development Commission Plans and the San Francisco Bay Area Regional Water Quality Control Board for developing its cumulative impact analysis. DEIR at 5-3.

and notification. The assertion that the County relied on a plan-based approach to its cumulative impact analysis lacks any evidentiary support.

B. List-Based Approach

The EIR identifies approximately 15 projects in its cumulative impact chapter. The EIR explains that the incremental, Project-specific impacts could interact with the continuing impacts of past projects and/or the impacts of other projects currently under consideration as well as reasonably foreseeable future projects. DEIR at 5-4. Unfortunately, the EIR does not take the necessary next steps to actually identify or analyze the effects that would result from these projects' interactions. [6] CEQA requires that an EIR should include a summary of the expected environmental effects to be produced by those projects.

Finally, it is important to emphasize the EIR's failure to examine the environmental impacts resulting from Phillip 66 Rodeo's intention to shift to "advantaged crudes" over the next several years. The fact that Phillips 66 itself, as well as the Securities and Exchange Commission, confirm the refinery's intention to import advantaged crude to its west coast refineries requires that this EIR analyze the effects that this advantage crude stock, together with the proposed Project would have on air quality, GHG levels and hazards.

For the reasons discussed above, the EIR's cumulative impact analysis is fatally flawed and does not meet CEQA's clear requirements. Because substantial evidence demonstrates that the Project will have significant cumulative impacts, the County must revise the EIR's analysis, identify mitigation, and recirculate it.

V. Conclusion

Like its predecessor, the Recirculated EIR fails to comply with the requirements of

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[6] The EIR does purport to identify the cumulative health risk from the Project and the Phillip 66 Marine Terminal Project, likely because the BAAQMD had already prepared a health risk analysis of the Marine Terminal Project. *See* DEIR at 5-9. While we have not determined the accuracy of this analysis, it is important to point out that this is the *only* cumulative analysis included in the EIR. This is the type of analysis that should have been conducted for the Phillips 66 Project and the other 14-plus cumulative projects.

CEQA. The Project will cause significant impacts that are not adequately addressed and mitigated in the REIR. On behalf of the Rodeo Citizens Association, we respectfully request that the REIR be revised to address these concerns, and that the revised document be recirculated, in order to comply with CEQA.

Thank you for consideration of our comments.

Very truly yours,

SHUTE, MIHALY & WEINBERGER LLP

Laurel L. Impett, AICP, Urban Planner

Ellison Folk

cc: Janet Pygeorge, Rodeo Citizens Association
Janet Callaghan, Rodeo Citizens Association

Exhibits:

Exhibit A: WestPac Pittsburg Energy Infrastructure Project RDEIR, Hazards and Hazardous Materials chapter, July 2013.

Exhibit B: Phillips SMR Rail Spur Project Draft EIR, Hazards and Hazardous Materials chapter, November 2013.

Exhibit C: Derailment Probability Analyses and Modeling of Mainline Freight Trains, R. Anderson and C. Barkan.

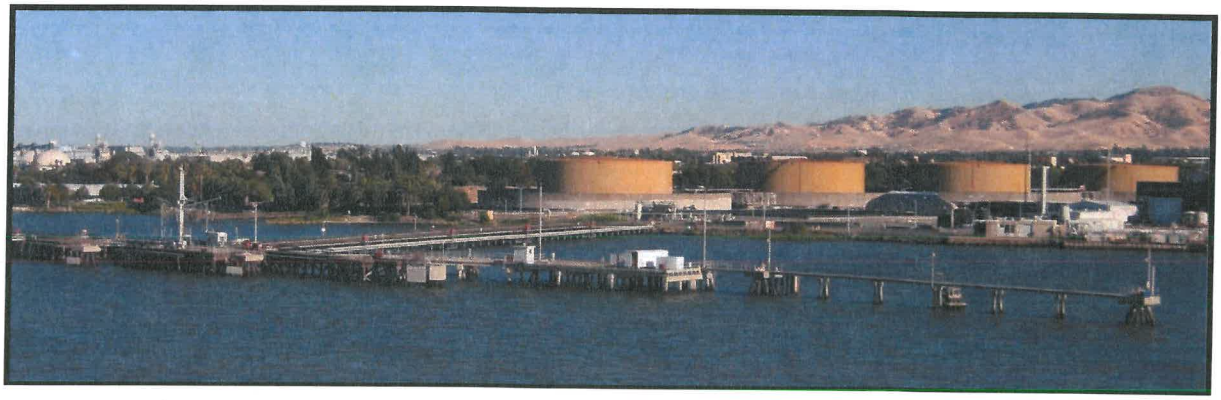
Exhibit A

EXHIBIT

Exhibit A

Recirculated Draft Environmental Impact Report
WesPac Pittsburg Energy Infrastructure Project

State Clearinghouse No. 2011072053



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10.0 HAZARDS AND HAZARDOUS MATERIALS

This chapter describes hazards and hazardous materials currently present in the project area and those that could be introduced by the project. This chapter includes a description of the project's potential to result in hazardous materials exposure to persons or the release of hazardous materials to the environment, and safeguards to limit the probability and potential consequences of such events. Additional related discussion is presented in Chapter 4.0: Air Quality; Chapter 6.0: Aquatic Resources; Chapter 7.0: Terrestrial Resources; Chapter 9.0: Geology, Soils, and Seismicity; Chapter 11.0: Public Services and Utilities; Chapter 16.0: Marine Transportation and Marine Terminal Operations; and Chapter 17.0: Water Resources.

Guidelines and key sources of data used in the preparation of this chapter include the following:

- The Cortese List
- Technical reports prepared for the site of the proposed project
- California Department of Education Guidance Protocol for School Site Pipeline Risk Analysis
- California State Fire Marshal Hazardous Liquid Pipeline Risk Assessment
- Published studies and risk statistics for releases and fires at petroleum storage tanks (or resulting from the storage of petroleum) and within or resulting from pipeline and rail transport.

For purposes of this analysis, the terms hazardous material and hazardous substance are used interchangeably and are defined as any material that appears on a list of hazardous materials prepared by a federal, state, or local agency, or any material that has characteristics as defined by such an agency. Hazardous materials are defined in the Health and Safety Code (HSC), Section 25501(o), as:

> *"…any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment."*

A hazardous waste is a hazardous material that no longer has a practical use such as substances that have been discarded or discharged, or that are being stored prior to disposal or recycling, except as exempted from the definition of hazardous waste by federal and State regulations.

Crude oil is a naturally occurring viscous liquid comprised primarily of hydrocarbons and other organic constituents. The composition of crude oil varies depending on the type and how it is extracted. Hydrocarbons generally account for 50 percent to 97 percent of the mixture. Other organic constituents such as nitrogen, oxygen, and sulfur typically make up between 6 percent and 10 percent. Inorganic constituents, including metals such as copper, nickel, vanadium, and iron, account for less than 1 percent of the total composition. Crude oil is a hazardous material pursuant to various federal and state regulations, e.g., the U.S. Department of Transportation (DOT) regulations list crude oil as a Class 3 flammable liquid.

Fuel oil, gas oil and vacuum gas oil would also be handled by the project. These are products that remain from the crude oil after the more volatile and more flammable hydrocarbon products, such as gasoline range hydrocarbons, have been removed. These products also are hazardous materials pursuant to various federal and state regulations. Since the most volatile and flammable hydrocarbon products have been removed, they are less flammable than crude oil. Fuel oil and gas oil are classified as combustible liquids under DOT regulations. Vacuum gas oil is less flammable and does not meet DOT's criteria for either flammable or combustible. Nevertheless, vacuum gas oil can emit vapors that will burn if the oil is heated above the flash point (approximately 270 degrees Fahrenheit).

10.1 ENVIRONMENTAL SETTING

The following sections describe the existing environmental setting relevant to the assessment of potential project hazards and hazardous materials risks. Relevant considerations include existing project area conditions and the laws, regulations and requirements already in place that would limit the potential for the project to have impacts associated with hazards and hazardous materials. The hazards and hazardous materials analysis in this chapter is primarily focused on onshore project facilities. Hazard risks associated with the project's offshore marine terminal activities are discussed in Chapter 16.0: Marine Transportation and Marine Terminal Operations.

10.1.1 Regulatory Context

Laws and regulations are currently in place to govern the safe storage, use, handling, transport, and disposal of hazardous materials and contingency planning to minimize potential impacts of accidental releases of hazardous materials if such releases should occur. Key laws and regulations relevant to the project are discussed below.

10.1.1.1 Federal Regulations

A number of federal laws regulate safety of marine terminals, onshore storage terminals, and pipeline and rail transport operations. These laws address, among other things, design, construction, and operations standards; operations monitoring and inspection requirements; training standards; security standards; spill prevention; and spill response preparedness and preparation.

Oil Pollution Prevention

The National Oil and Hazardous Substances Pollution Contingency Plan, commonly referred to as the National Contingency Plan (NCP), defined in 40 Code of Federal Regulations (CFR) 300, is implemented under the U.S. Environmental Protection Agency (EPA) Emergency Management Program. The NCP outlines federal oil spills and hazardous substance releases response procedures and designates the EPA as the lead agency for onshore releases. The EPA also serves as co-chair of the Regional Response Team, which is a team of agencies established to provide assistance and guidance to the on-scene coordinator during the response to a spill.

Implemented under the EPA Emergency Management Plan, the Oil Pollution Prevention regulation (40 CFR 112) implements federal requirements for regulated facilities to have Spill Prevention, Control, and Countermeasures (SPCC) Plans; and Facility Response Plans (FRPs). SPCC Plans must address requirements for oil spill prevention, preparedness, and response measures to prevent oil discharges from reaching navigable waters and adjoining shorelines. SPCC Plans include information such as site security measures; personnel training, testing, inspection, and record-keeping procedures; secondary containment and oil spill controls; emergency notification procedures; and reporting requirements. In addition to a detailed directive of all information and measures required to be included in an SPCC Plan, the regulations included in 40 CFR 112 include standards for spill prevention adequacy measures that would apply to the project, including, but not limited to:

- Requirements for secondary containment for all oil storage containers or tanks with a capacity of 55 gallons or more
- Requirements for secondary containment at all oil transfer locations
- Specified types of secondary containment structures and equipment acceptable for use to satisfy the regulation
- Capacity requirements for secondary containment

- Requirements for all inspections and tests to be conducted in accordance with written procedures developed for the facility, with records of inspections and tests signed by an appropriate supervisor or inspector and maintained for at least three years
- Requirements for determination of appropriate qualifications for persons conducting inspections and testing
- Requirements for frequency of inspections and testing
- Requirements for the minimum elements of infrastructure, equipment and processes that must be inspected
- Requirements for acceptable container and tank fabrication materials
- Requirements for high liquid level alarms or pump cutoff devices
- Requirements for training topics for all oil-handling personnel
- Requirements for security measures, including controlling of access to oil handling areas, securing flow and drain valves and loading and unloading connections, and security lighting

The SPCC Plan would need to be prepared and implemented prior to operations.

A copy of the SPCC Plan must be maintained at the facility at all times. The SPCC Plan would be reviewed and certified by a qualified licensed Professional Engineer. By Certification, the engineer must attest that: (1) they are familiar with the 40 CFR 112 requirements; (2) they have visited and examined the facility; (3) the plan has been prepared in accordance with good engineering practice, industry standards, and the requirements of 40 CFR 112; (4) procedures for inspections required by the SPCC Plan have been established; and (5) the SPCC Plan is adequate for the facility.

A FRP demonstrates that a facility is capable of responding to a worst-case oil discharge, to the maximum extent practical. A worst-case discharge, pursuant to 40 CFR 112 regulations, would include the volume of the largest tank in any secondary containment area. This means that the project would be required to put in place measures to respond to release scenarios up to 500,000 barrels (BBLs), or 21 million gallons. FRPs include measures such as emergency reporting and notification directives; evacuation routes and signals; headcount protocols; responsibilities of critical operating personnel and emergency coordinators; rescue and medical services and resources; emergency contacts for plant personnel; identified spill response contractors for land and water releases; records of accessible oil spill emergency response equipment; and actions to be performed in the event of a release, fire, or earthquake. The FRP prepared for this project

would be required to be reviewed and approved by the EPA, U.S. Coast Guard and California Department of Fish and Wildlife's (CDFW) Office of Spill Prevention and Response, as well as other federal and state agencies prior to operations.

Emergency Planning and Community Right-to-Know

The federal Emergency Planning and Community Right-To-Know Act (EPCRA) (42 United States Code [USC] 116) requires facilities to prepare and submit Material Safety Data Sheets (MSDS) and hazardous chemical inventory forms to the State Emergency Response Commission, Local Emergency Planning Committee (LEPC), and local fire department. The LEPC, upon request by any person, shall make available a MSDS in accordance with 42 USC 119, Section 11044. Meeting this federal requirement is achieved through compliance with the California Hazardous Materials Business Plan (HMBP) program (HSC Section 25504 (a-c)), discussed in Section 10.1.1.2. The EPCRA also includes key provisions regarding emergency planning, emergency notification, and toxic-release inventories.

Pipeline Safety

Operators of onshore oil pipelines that, because of their location, could reasonably be expected to cause substantial harm, or significant and substantial harm, to the environment by discharging oil into any navigable waters of the United States, or on to adjoining shorelines, are required by 49 CFR 194 to prepare a Response Plan for Onshore Oil Pipelines (Response Plan). Response Plans must be consistent with the NCP and applicable area contingency plans (ACPs) and must include procedures and a list of resources for responding, to the maximum extent practicable, to a worst-case discharge. Response Plans must also identify environmentally and economically sensitive areas and contain spill detection and mitigation procedures. Additionally, Response Plans must detail notification procedures, establish provisions to ensure the protection of safety at the response site, identify training and equipment testing procedures, and contain a drill program in accordance with the national Preparedness for Response Exercise Program (PREP) Guidelines. Response Plans are to be submitted to, and approved by, the Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, DOT (49 CFR 194.119).

Federal pipeline safety regulations at 49 CFR 195.452 include requirements for inspecting and managing the integrity of pipeline segments in areas that have the potential to impact High Consequence Areas (HCAs). HCAs include densely populated areas, ecologically sensitive areas and waterways used for commercial navigation. The project area is within an HCA and, therefore, would be required to operate under an Integrity Management Program pursuant to 49 CFR 195.452 requirements. The Integrity Management Program would include operating procedures for managing the risk of impact to HCAs, including pipeline integrity evaluation and assessment, evaluation and repairs of defects, and integrity

management recordkeeping. Additional requirements mandated for pipelines operating within HCAs provide extra levels of regulatory protection compared to pipelines located outside of HCAs.

Hazardous Waste Management

The federal Resource Conservation and Recovery Act of 1976 (RCRA) established a "cradle-to-grave" regulatory program governing the generation, transportation, treatment, storage, and disposal of hazardous waste. 40 CFR 260 *et seq*. establishes detailed requirements for the management of hazardous waste under RCRA. Additionally, RCRA provides for states to implement their own hazardous waste programs as long as the state program is at least as stringent as federal RCRA requirements.

Worker Safety

The Occupational Safety and Health Administration (OSHA) is responsible for assuring safe and healthful workplaces by setting and enforcing standards and by providing training, outreach, education, and assistance. OSHA implements and enforces regulations pertaining to general industry standards (29 CFR 1910) and construction operations (29 CFR 1926), and both of these sections address the handling of toxic or hazardous material.

OSHA is responsible for overseeing the regulations regarding employee emergency action plans (29 CFR 1910.38 and 1926.35), which identify designated actions which employers and employees must take to ensure employee safety from fire and other emergencies.

10.1.1.2 State and Local Regulations

Area Contingency Plans

The Office of Oil Spill Prevention and Response (OSPR) was created within the CDFW to adopt and implement regulations and guidelines for spill prevention, response planning, and response capabilities. The OSPR has developed ACPs for the marine waters of California, and the proposed project would be located in the geographical area addressed in the San Francisco Oil Spill Contingency Plan. The San Francisco Oil Spill Contingency Plan has been developed by the OSPR to be, when implemented in conjunction with the NCP, adequate to remove a worst-case discharge of oil, and to mitigate or prevent a substantial threat of such a discharge from a vessel, offshore facility, or onshore facility operating in or near the geographic area. The San Francisco Oil Spill Contingency Plan provides preparatory measures, procedures and resource allocation to ensure rapid, well-organized, and appropriate response to a potential oil spill. It addresses response agency coordination and response roles and resources, response measures, logistics, human health and safety and resource protection hierarchy, sensitive infrastructure and resource protection, funding, and other planning measures for a wide range of spill scenarios and locations.

The OSPR contracts oil spill response organizations (OSROs) to ensure available resources in accordance with the San Francisco Oil Spill Contingency Plan, and monitors these organizations' response capabilities through unannounced drills and other methods. The OSROs have the ability to rapidly respond to a variety of oil-spill incidents, and play an integral role in OSPR's planned response efforts. Additional information regarding the OSPR is provided in Chapter 16.0: Marine Transportation and Marine Terminal Operations.

Hazardous Materials Management Act

The State of California (HSC Division 20, Chapter 6.95) requires any business that handles more than a specified amount of hazardous or extremely hazardous materials, termed a "reportable quantity," to submit a HMBP to its Certified Unified Program Agency (CUPA). HMBP requirements are specified in Title 19 California Code of Regulations (CCR) Division 2, Chapter 4, Article 4. Business plans must include an inventory of the types, quantities, and locations of hazardous materials at the facility. Businesses are required to update their business plans at least once every three years and the chemical portion of their plans every year. Also, business plans must include emergency response plans and procedures to be used in the event of a significant or threatened significant release of a hazardous material. These plans need to identify the procedures to follow for immediate notification to all appropriate agencies and personnel of a release, identification of local emergency medical assistance appropriate for potential accident scenarios, contact information for all company emergency coordinators, a listing and location of emergency equipment at the business, an evacuation plan, and a training program for business personnel.

Businesses that handle hazardous materials are required by law to provide an immediate verbal report of any release or threatened release of hazardous materials if there is a reasonable belief that the release or threatened release poses a significant present or potential hazard to human health and safety, property, or the environment.

City of Pittsburg Municipal Code (PMC) Section 18.84.270 et seq. are local regulations intended to ensure that the use, handling, storage, and transport of hazardous materials is compliant with requirements of the Hazardous Materials Management Act provisions. PMC Section 18.84.270 et seq. also ensures that the City is notified of HMBPs, unauthorized releases of hazardous materials, and any changes at a facility that could affect the public health, safety or welfare. Under these regulations, the project would require a Use Permit for storage, handling, and transport of bulk hazardous materials.

Pipeline Safety

The California Pipeline Safety Act (California Government Code Title 5, Part 1, Chapter 5.5) provides regulatory jurisdiction and enforcement authority to the California State Fire Marshal (SFM) for the safety of all intrastate hazardous

liquid pipelines. Through reference to 49 CFR 195 in the California Pipeline Safety Act, the SFM is responsible for implementing requirements pertaining to design, construction, testing procedures, corrosion control, maintenance, personnel qualifications, and reporting for hazardous liquid transport via pipeline. Additionally, the SFM oversees the process of transitioning a pipeline from 'out-of-service status' to 'active status' by performing pipeline inspections, reviewing pipeline records to ensure past compliance with state and federal pipeline regulations, reviewing written plans describing the process and testing procedures that would be used to demonstrate pipeline integrity, and granting or denying 'active status' approval.

For each pipeline system, pipeline operators are required to prepare and follow a manual of written procedures to ensure safety during pipeline maintenance and normal operations, abnormal operations, and emergencies (49 CFR Part 195.402). The maintenance and normal operations section of the manual must include current maps and records and procedures for operating, maintaining, repairing, starting up, and shutting down the pipeline system; minimizing the potential for hazards; and implementing applicable control room management procedures. The abnormal operations section addresses scenarios in which the operating design limits have been exceeded and must include procedures for responding to, investigating, and correcting the cause of abnormal operations. The emergencies section of the procedures manual must identify procedures for prompt and effective response, assessing the area impacted by the hazard, and minimizing public exposure to injury. Safety-related condition reports must also be included in the procedures manual and include instructions enabling personnel who perform operation and maintenance activities to recognize potential safety-related conditions subject to the reporting requirements of 49 CFR 195.55.

Hazardous Waste Control

The generation, transportation, treatment, storage, and disposal of hazardous waste in California is regulated by the California Department of Toxic Substances Control (DTSC) under 22 CCR Division 4.5. These hazardous waste management regulations: (1) establish criteria for identifying, packaging, and labeling hazardous wastes; (2) dictate the management of hazardous waste; (3) establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and (4) identify hazardous wastes that cannot be disposed of in landfills. These regulations also require hazardous waste generators to prepare a Hazardous Waste Contingency Plan that describe hazardous waste storage and secondary containment facilities, emergency response and evacuation procedures, and an employee hazardous waste training program.

California State Lands Commission

As required by Section 2430 of CCR Title 2, Division 3, Chapter 1, Article 5.1, a marine oil terminal operator must implement a Marine Oil Terminal Security Plan, which at a minimum must:

- appoint a Marine Oil Terminal Security Officer to take responsibility for security matters;
- include security practices and procedures, responsibilities of the security officer, and physical security measures (e.g., communications, lighting, fencing, terminal access control, security organization, and training program);
- provide for the safety and security of persons, property, and equipment at the terminal and along the dock side of vessels moored at the terminal;
- prevent and deter the carrying of any weapon, incendiary, or explosive in stores or carried by persons onto the terminal or to the dock side of vessels moored at the terminal; and
- prevent or deter unauthorized access to the terminal and to the dock side of vessels moored at the terminal.

The Marine Facilities Division of the California State Lands Commission reviews and oversees marine oil terminal security plans.

Worker Safety

The California Division of Occupational Safety and Health (Cal OSHA) implements and enforces the Injury and Illness Prevention Program (IIPP) per the regulatory requirements in Title 8, CCR Section 3203. These programs are facility specific and designed to protect workers and the public from health or safety hazards. The Hazard Communications Standard (29 CFR 1910.1200), enforced under Cal OSHA, requires employers to provide employees with effective information and training on hazardous chemicals in their work area to the extent necessary to protect them in the event of a spill or leak of hazardous chemicals.

Certified Unified Program Agency

The Contra Costa County Health Services (CCCHS) would be the CUPA for the proposed project. The CCCHS is certified by the California Secretary of Environmental Protection to implement the Unified Hazardous Waste and Hazardous Materials Management Regulatory Program specified in the HSC, Chapter 6.11. As such, the CCCHS oversees the regulatory programs for aboveground storage tanks (Assembly Bill 1130) and hazardous waste generators, including facility inspections, permitting, and HMBPs.

Water Quality Protection

Under the Porter-Cologne Water Quality Control Act, the State Water Resources Control Board (SWRCB) has jurisdiction for all discharges of hazardous materials that affect surface water or ground water. The SWRCB implements its regulations

locally through nine Regional Boards. The project occurs within the San Francisco Regional Water Quality Control Board's region.

10.1.2 Existing Conditions

10.1.2.1 Existing Facilities

The majority of the infrastructure for the proposed project is already in place, including the storage tanks, marine terminal, onsite storage terminal pipelines, storage terminal secondary containment, and the San Pablo Bay Pipeline and KLM common-carrier pipeline, and would be operated similar to past use. Detailed descriptions of existing facilities are provided in Chapter 2.0: Proposed Project and Alternatives.

Off-site pipelines primarily traverse open space, with some exceptions discussed in Section 10.2.3. The existing East and South Tank Farms are bounded to the north and west by Suisun Bay, the NRG Energy, Inc. (NRG, formerly GenOn Delta LLC) Pittsburg Generating Station, and open space. The NRG facility uses and stores some hazardous materials, including hydrocarbons, various gases (e.g., hydrogen, helium), ammonia, acids, and bases, as part of its existing operations. Residential areas currently exist to the south and east of the Terminal and Rail Transload Facility.

10.1.2.2 Historical Releases and Potential Hazardous Materials Present

The pipes located on the site of the proposed project were historically used for transport of fuel oil, and have not been in use since 1990. There is potential for trace amounts of hazardous material, in the form of fuel oil, to exist in these pipes. The aboveground storage tanks located on the proposed project site have been decommissioned for over 15 years, and there is a potential for hazardous material, in the form of hydrocarbon vapor or residue, to exist in the tanks.

A Phase II Environmental Site Assessment (Fluor Daniel GTI, 1998) identified the following potential for hazardous materials to be present:

- Portions of the storage terminal are underlain with fill from an unknown source. Hazardous constituents have not been identified in this fill, but historical fill from unknown sources can sometimes contain hazardous, naturally occurring or anthropogenic contaminants, so there is a potential for these to exist.

- The project site may contain asbestos-containing materials (ACMs) in building, wiring, insulation, caulking, gaskets and other existing building materials.

- Past releases of No. 6 fuel oil have occurred from previous site operations and residual hydrocarbons, metals and polycyclic aromatic hydrocarbons (PAH) are reported present in subsurface soils and shallow groundwater. Total PAH concentrations measured in soils are typically below 3,000 milligram per kilogram. Except for isolated locations near Tank 1 and Tank 16, PAH measured in soils are below preliminary remediation goals established for residential areas.

The Phase II Environmental Site Assessment identified three locations requiring soil remediation that could be disturbed by the project: (1) an isolated location adjacent to Tank 1; (2) an isolated location near Tank 9; and (3) an area between Tanks 11 and 16. More locations may be identified when excavations occur for project construction; however, as required by OSHA regulations under 8 CCR 1510 and 1511, construction workers would be appropriately trained for the identification of impacted soils, as further described in Section 10.2.3, Impacts and Mitigation Measures.

Additionally, there is a potential for lead to be present at the proposed project site in the form of lead-based paint, piping materials, and other materials.

The San Pablo Bay Pipeline crosses three properties identified on the Cortese List, pursuant to Government Code Section 65962.5:

- Between milepost (MP) 12 and MP 13 (see Figure 10-1: Locations of Cortese List Sites), the pipeline passes along the southern edge of the former Shell Land Disposal site. There are no specified chemicals of concern at this site, and no remedial actions have been taken (SWRCB, 2011).

- Between milepost MP 11 and MP 12 (see Figure 10-1), the pipeline passes along the southern edge of the Pacific Atlantic Terminal site. Potential constituents of concern at this site include arsenic and lead (DTSC, 2011; SWRCB, 2011).

- Between MP4 and MP 9, the pipeline passes through the portion of the Concord Naval Weapons Station (CNWS) known as the "Tidal Area," also known as the Military Ocean Terminal Concord site and the Naval Weapons Station Seal Beach, Detachment Concord. The site is a Department of Defense ammunitions transshipment port under the operation of the Department of Army. Several contaminated soil and groundwater locations exist on the CNWS property. Located in proximity to the pipeline, soil and groundwater contaminated with petroleum hydrocarbons is present near the eastern parcel boundary, and a site with mercury-contaminated soil is positioned near the western parcel boundary. Additionally, soil and groundwater contamination resulting from the historical disposal of wooden materials treated with preservatives (i.e., chromium, arsenic, and copper) may be present along the pipeline (Friedman, 2011; SWRCB, 2011).

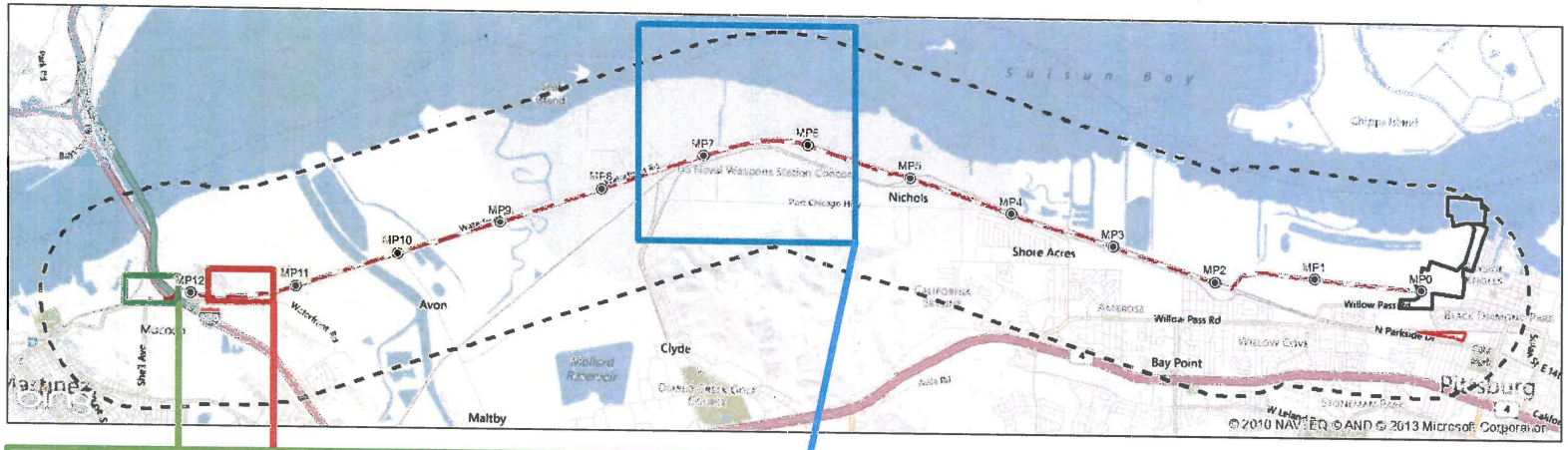
Portions of the former Old Valley Pipeline (OVP) and Tidewater Association Oil Company (TAOC) pipelines, which historically ran along North Parkside Drive, could be encountered during excavation activities for the proposed KLM Pipeline connection. These formerly active crude oil pipelines were constructed at depths of up to 10 feet below ground surface during the early 1900s, where the steel pipelines were typically encased in a protective coating composed of coal tar and ACM. When the OVP and TAOC pipelines ceased operation in the 1940's and 1970's, respectively, the degree and method of decommissioning varied; in some instances the pipelines were removed, where in others, they remained in place. Soil in this area could potentially be impacted by crude oil since numerous historical release points along the former OVP and TAOC pipelines have been identified through risk assessments (Chevron Energy Solutions, 2012).

10.1.2.3 Sensitive and Other nearby Receptors

In this chapter, sensitive receptors are human receptors that may be particularly vulnerable to a hazard compared with the general public, such as persons at schools, hospitals, or convalescent homes. Identified sensitive-receptor locations within a 0.25-mile radius of the proposed storage terminal, include: St. Peter Martyr School and Extended Care Facility located at 425 West Fourth Street, and First Baptist Head Start located at 204 Odessa Avenue (see Figure 10-2: Sensitive Receptor Locations). One additional school, Parkside Elementary School, is located approximately 800 feet south of the proposed KLM Pipeline connection and 1,200 feet south of the pipeline connection between the Terminal and the Rail Transload Facility. City Park is located approximately 900 feet southeast of the Rail Transload Facility. No sensitive receptors were identified within 0.25 mile of the proposed San Pablo Bay Pipeline.

Two churches are located within a 0.25-mile radius of the proposed storage terminal. Specifically, the Stewart Memorial Methodist Church (located at Linda Vista Way and Front Street) and the First Baptist Church (located on Odessa Drive) are positioned within the residential neighborhood east of the East Tank Farm. Riverview Park and Marina Park are located offsite and immediately north and south of the East Tank Farm (respectively). The Pittsburg Marina, along with an existing established residential area, is located to the east of the site. A portion of Marina Park is proposed for planned residential development. Existing residential areas exist to the southeast of Tank 9, and to the southeast of Tank 15, near a portion of the proposed KLM Pipeline connection, Rail Transload Facility and associated Rail Pipeline. Accumulated stormwater and drainage from the East and South Tank Farms would be directed westward, toward Willow Creek (see Chapter 17.0: Water Resources, Section 17.1.2.11), away from these developed areas.

Residential areas also occur near the portion of the existing San Pablo Bay Pipeline that passes north of west Pittsburg.



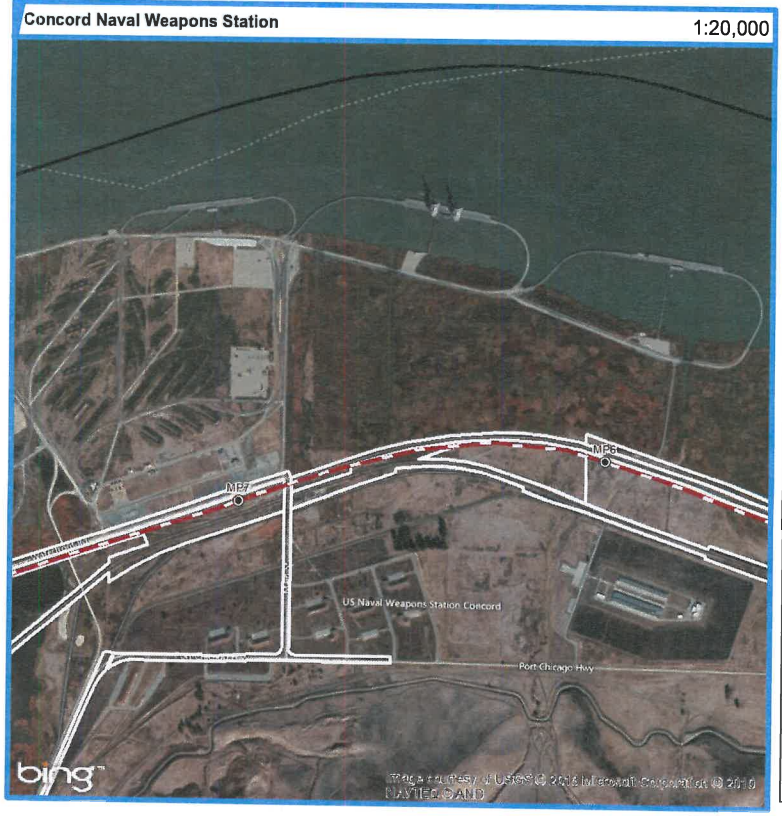


Figure 10-1
Locations of Cortese List Sites
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

- Mileposts
- Existing San Pablo Bay Pipeline
- Terminal Boundary
- Rail Transload Facility
- 1 Mile Pipeline Radius
- Parcel Boundary

N

7/18/2013

1 inch = 1 miles

1:70,000

0 0.5 1 mi

TRC

X:\WesPac\EIR Release\10 Hazards\mxd\Figure 10-2 Sensitive Receptors and Other Nearby Receptors.mxd

Figure 10-2 Sensitive Receptors and Other Nearby Receptors
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

TRC

7/18/2013

Receptors
Terminal Boundary
Rail Transload Facility

N

1:12,000

1 inch = 1,000 feet

ft
0 380 760

10.1.2.4 Public Emergency Services

California has developed an emergency response plan to coordinate emergency services provided by federal, state, and local government and private agencies. For Contra Costa County, the emergency response plan is administered by the California Emergency Management Agency (Cal EMA), which coordinates responses of other agencies, including the California Environmental Protection Agency, California Highway Patrol, CDFW, Regional Water Quality Control Board (RWQCB), and local fire departments. California law requires that the Cal EMA be notified in the event of an oil or hazardous substance release.

The Contra Costa County Fire Protection District (CCCFPD) provides emergency response and fire protection services to the project area. The Pittsburg Police Department and/or the Contra Costa County Sheriff's Department would provide law enforcement to the project. A detailed discussion of emergency public services, including fire and police protection, is provided in Chapter 11.0: Public Services and Utilities.

10.2 IMPACT ANALYSIS

10.2.1 Methodology for Impact Analysis

The hazards and hazardous materials impacts analysis includes:

- identifying hazards present and foreseeable scenarios that could result in exposure of persons or the environment to a project hazard;
- assessing the probability of foreseeable upset and worst-case upset scenarios, considering project design and operational controls, existing regulatory requirements applicable to the project, and other relevant factors;
- identifying potential consequences of foreseeable and worst-case scenarios considering existing environmental conditions and regulatory requirements for response planning and preparedness;
- identifying significant hazardous materials risks based on probability and potential consequences of foreseeable upset and worst-case upset conditions; and
- evaluating the project for possible effects on adopted emergency response plans.

Multiple sources of information, including government databases, technical reports, regulatory agency websites and online databases, local emergency response plans, and local municipal codes, were reviewed to assess where construction and/or operation of the project could have the potential to create significant adverse impacts relating to hazards, hazardous materials, or adopted

emergency response or evacuation plans. Additionally, locations of sensitive and other nearby receptors were identified for evaluation in the impact analysis.

10.2.1.1 Hazardous Materials and Hazardous Waste Sites

Hazardous materials and hazardous waste sites within or adjacent to the project footprint were identified using site-specific information following review of applicable databases (e.g., Cortese List).

The Cortese List (consisting of databases identified in California Government Code Section 65962.5) was consulted to identify sites with known hazardous materials or waste contamination within or adjacent to the project footprint. As discussed in Section 10.1.2.2, three Cortese List sites proximal to the San Pablo Bay Pipeline are present.

Other sources of information for site-specific information includes a Phase II Environmental Site Assessment, documentation from the Pittsburg Generating Station HMBP (GenOn, 2011) and FRP (Mirant Delta, 2005), and information on other pipeline locations in the area.

10.2.1.2 Hazard Risk Assessment and Modeling

Bulk storage tank accident analysis is a topic that has been widely studied worldwide as a result of the potential for significant impacts to human health and the environment, and the associated economic losses and liability. For the assessment of hazards related to the project's onshore tank farms, published studies of bulk tank failure mechanisms and statistics were evaluated to determine reasonable hypothetical release scenarios and potential impacts thereof, including worst-case scenarios that are not reasonably foreseeable.

To evaluate probabilities of potential hazards relating to the existing San Pablo Bay Pipeline, the proposed KLM Pipeline connection, and the Rail Pipeline, the California Department of Education guidance protocol for siting new schools was used (CDE, 2007). While this protocol does not apply to projects other than siting of school facilities, it provides a useful and conservative metric for assessment of pipeline risks to other types of facilities, in the vicinity.

10.2.1.3 Emergency/Evacuation Plans

The scope of the proposed project was analyzed with respect to existing local emergency response and evacuation plans within the project vicinity to identify any potential conflicts or shortfalls that may result from project construction and/or operation.

10.2.2 Significance Criteria

CEQA Guidelines at 14 CCR 15143 emphasize that an EIR shall focus on the significant effects on the environment. The significant effects should be discussed with emphasis in proportion to their severity and probability of occurrence.

CEQA Guidelines at 14 CCR 15064(d) state that in evaluating the significance of the environmental effect of a project, the Lead Agency shall consider direct physical changes in the environment which may be caused by the project and reasonably foreseeable indirect physical changes in the environment which may be caused by the project. An indirect physical change is to be considered only if that change is a reasonably foreseeable impact which may be caused by the project. A change which is speculative or unlikely to occur is not reasonably foreseeable.

For the purposes of this analysis, an impact related to hazards and hazardous materials would be significant if it would result in any of the following:

- A significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous material
- A significant hazard to the public or environment through reasonably foreseeable upset and accident conditions involving the release of a hazardous material to the environment
- A significant risk of a spill or other accident beyond the capabilities of existing and proposed emergency response resources
- A significant risk of fires, explosions, releases of flammable or toxic materials, or other accidents that could cause long-term health impacts to persons, loss of life, or substantial environmental consequences to sensitive resources
- A significant risk of hazardous emissions, or handling of hazardous materials, substances, or wastes within 0.25 mile of an existing or proposed school
- A significant risk to the public or the environment as a result of being located on a site that is included on the Cortese List
- Impair implementation or physically interfere with an adopted emergency response plan or emergency evacuation plan

The risk or hazard presented by a potential upset or accident conditions such as a fire or product release is dependent on two components: (1) the potential consequence; and (2) the likelihood (i.e., probability) of occurrence. The potential consequence of an accident-induced event is the level of harm that could potentially occur to people, property, or the environment, including special

consideration for sensitive and nearby receptors. The probability is the chance of the potential upset events actually occurring.

Both the potential consequence and the probability are key factors in weighing the hazard and risk. Those events with a severe potential consequence need not have a high probability of occurrence to be considered significant hazard or risk. On the other hand, events that have a low potential consequence level may be a less than significant hazard or risk even if they are likely to occur with frequency. Both consequence and probability of potential upset events are dependent on key regulatory framework; in general, the more robust and reliable the regulatory controls on a project component (such as the project-related pipelines and storage tanks), the less significant the risk of impact.

10.2.3 Impacts and Mitigation Measures

10.2.3.1 Proposed Project

Construction-related Impacts

Impact Hazards and Hazardous Materials (HM)-1: Create a hazard to workers, the public, and/or the environment through the routine transport, use, and/or disposal of hazardous materials. (Less than significant.) Vehicles and equipment used for construction of the project would contain or require the short-term use of hazardous materials, including, but not limited to, fuels, lubricating oils, solvents, antifreeze, hydraulic fluid, and compressed gasses. In addition, construction activities would utilize some hazardous materials such as paints and solvents and would generate hazardous waste streams such as waste oil and empty containers that previously held hazardous materials. The potential exists for an accidental release of these hazardous materials during routine construction activities or routine hazardous materials transport related to construction. Construction activities also have the potential to result in exposure to these hazardous materials by workers, or by the public, if access to the construction site is not adequately controlled or if the materials are not properly handled and contained. Potential hazards to workers, the public, and the environment from routine use, transport, or disposal of hazardous materials handled for routine construction would be limited by existing pollution prevention, waste management, worker health and safety, and transportation safety regulations that would apply to the project, as described in the following paragraphs.

In accordance with applicable NPDES program regulations, the project would be required to obtain coverage under a National Pollutant Discharge Elimination System Permit for stormwater discharges from construction activities. This requirement could be satisfied through NPDES Permit No. CAS000002, State General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (State Water Resources Control Board Order No. 2009-0009-DWQ). To be covered by this permit, a Notice of Intent and Storm Water Pollution Prevention Plan (SWPPP) would need to be filed with the

RWQCB. The SWPPP would need to include best management practices (BMPs) that would prevent or minimize the release of potential pollutants during construction activity. These BMPs would need to encompass measures to effectively prevent or minimize pollutants from being discharged in stormwater, as described in detail in Chapter 17.0: Water Resources. These measures would directly limit the potential for hazardous materials exposure via stormwater for workers, the public, and the environment. In addition, the hazardous materials containment and control measures required to be implemented as part of the BMPs would limit the potential for direct exposure through controlled handling measures for hazardous materials. As described in Section 2.7.7, Environmental Commitment HM-1 commits the project to incorporating BMP's in the construction SWPPP to limit the potential for hazardous materials exposure via stormwater for workers, the public and the environment.

Regulations promulgated under the federal RCRA and California Hazardous Waste Management Act include rigorous requirements that limit the potential for releases of hazardous waste to the environment and the potential for public and worker exposure. The State regulations, codified in CCR Title 22, Division 4.5, are more stringent than the federal regulations. These regulations include specific requirements for identifying, accumulating, and managing hazardous wastes on-site, transport of hazardous wastes off-site, and treatment and disposal of hazardous wastes at properly designed and permitted facilities. Compliance with these requirements would minimize the risk of hazardous wastes being released to the environment or receptors. These regulations would apply to any hazardous waste generated during construction, including soil and construction or demolition wastes that are hazardous pursuant to 22 CCR Division 4.5 regulations. All of these materials would be required to be managed in a manner that prevents release to the environment. As described in Section 2.7.7, Environmental Commitment HM-2 commits the project to complying with 22 CCR Division 4.5 regulations for hazardous waste.

In addition, the project would be required to comply with Cal OSHA standards for worker safety in the handling and use of hazardous materials and hazardous wastes. 8 CCR Sections 337-340 require an employer to monitor work exposure to hazardous substances and notify workers of exposure to hazardous substances. The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substances exposure warnings. Cal OSHA regulations in 8 CCR 3203 and 1509 would further require an IIPP for construction. The IIPP would specify protective clothing and gear to be used during task-specific activities, including work where exposure to hazardous materials could occur. The IIPP must also include, in part: identification of the person or persons with authority and responsibility for implementing the program; a system for ensuring that employees comply with safe and healthy work practices; a system for communicating with employees in a form readily understandable by all affected employees; procedures for identifying and evaluating workplace hazards, including scheduled periodic inspections to

identify unsafe conditions or practices; procedures for correcting unsafe conditions or practices; and training and instruction. 8 CCR 3208 requires recordkeeping of inspections and actions taken to prevent unsafe conditions or practices and of health and of health and safety training for each employee. As described in Section 2.7.7, Environmental Commitment HM-3 commits the project to complying with OSHA standards for worker safety in the handling and use of hazardous materials.

If construction activities include staging of 1,320 gallons or more of fuel or other petroleum products in aboveground tanks or other containers with individual volumes of 55 gallons or more, such petroleum storage would be subject to the SPCC Plan requirements of 40 CFR Part 112. These regulations are designed, in part, to ensure that petroleum products are properly contained to minimize the potential for a release of oil to surface waters, thereby limiting the potential for related exposure to the environment, workers, and the public. As described in Section 2.7.7, Environmental Commitment HM-4 commits the project to complying with SPCC Plan requirements.

CCR Title 19, Division 2, Chapter 4, Article 4 would require that a HMBP be prepared and followed for project construction and submitted to the CUPA. These regulations would require the HMBP to include an inventory of hazardous materials present and their characteristics, and requirements for employee training, inspections, release preparedness, site maps designed for emergency response planning, and other measures. The HMBP would be reviewed by the CUPA and used by emergency responders to facilitate emergency response planning and to ensure that potential response requirements are considered. Environmental Commitment HM-5 in Section 2.7.7 commits the project to complying with these requirements.

The federal Hazardous Materials Transportation Law (49 USC 5101-5127) is the primary foundation for the regulatory control of transportation of hazardous materials. The purpose of the federal Hazardous Materials Transportation Law is to "protect against the risks to life, property, and the environment that are inherent in the transportation of hazardous materials." In addition, the Hazardous Materials Regulations (49 CFR Parts 171-180) contain requirements for hazardous materials classification, hazard communication, packaging requirements, operational rules, training and security, and registration. All hazardous materials being transported must be handled, packaged, labeled, and transported in a manner that is consistent with Hazardous Materials Regulations set forth for each categorized hazardous material/waste. As described in Section 2.7.7, Environmental Commitment HM-6 adheres the project to complying with these requirements.

The adoption of requirements of existing laws and regulations and NPDES Permit No.CAS000002 (see Chapter 2.0: Proposed Project and Alternatives, Section 2.7), as described in the preceding paragraphs, would provide for hazardous material inventory, proper training, proper handling and disposal, personal protective

equipment, response preparedness, BMPs, and other measures that limit the potential for exposure from routine use of hazardous materials or routine generation of hazardous wastes during construction. With these measures unhealthful levels of exposure by workers or the public would not be expected. Furthermore, adherence to these regulations and requirements would prevent releases to the environment by routine transport use and disposal of hazardous materials during construction. Considering these factors, the hazard presented by routine use of hazardous materials during construction to workers, the public, and the environment would be less than significant.

Mitigation Measure: No mitigation required.

Impact HM-2: Create a hazard to workers, the public, and/or the environment through exposure to existing hazardous materials at the site. (Less than significant.) As described in Section 10.1.2.2, crude oil and other hazardous constituents may be present in the subsurface at the tank farms. Unknown impacted soils and/or hazardous constituents could also be identified along project pipeline routes, during construction excavations for the Rail Transload Facility, and within construction debris. Where project construction involves soil excavation, exposure to hazardous materials could occur if such materials are present in excavation locations. Regulations at 8 CCR 1511 would require that, prior to construction, a thorough survey of site conditions be conducted to determine, to the extent practicable, the predictable hazards to employees and the kind and extent of safeguards necessary to execute the work in a safe manner (8 CCR 1511). The known or suspected existence of petroleum hydrocarbons, metals and asbestos, described in Section 10.1.2.2 would be addressed in this survey and the safeguards necessary to conduct the work in a safe manner for these or any other hazardous materials that may be encountered would be implemented in accordance with 8 CCR 1511. In situations where employees are subject to known job-site hazards (e.g., flammable liquids and gases, toxic materials, confined spaces), they would be instructed in the recognition of the hazard, procedures to protect themselves from injury, and first aid procedures in the event of an injury (8 CCR 1510). As described in Section 2.7.7, Environmental Commitment HM-7 commits the project to complying with 8 CCR 1510 and 1511 regulations. In addition to regulatory requirements, for construction excavations where impacted soils may be encountered, Environmental Commitment HM-8 commits the project to providing a soil management plan for review by the City and the CUPA prior to construction (see Section 2.7.7). The soil management plan would identify procedures for detecting impacted soils in excavations and for handling of such soils, in accordance with applicable laws and regulations, to ensure that releases to the environment, or unacceptable levels of exposure by the public and workers, do not occur.

Additionally, the potential exists for ACMs to exist throughout the proposed project site as building, wiring, and pipe-insulation materials. During upgrades or removal of these features, ACMs would be handled and disposed of in accordance

with Cal OSHA regulations. Regulations under 29 CFR 1926.1101 and 8 CCR 1529 would govern the safe removal of materials containing asbestos for the project. Protective measures required by these regulations include, but are not limited to: training, oversight by competent individuals, personal protective equipment such as respirators and special clothing for workers, and required engineering controls and work practices to limit exposure to a safe level and to prevent release of asbestos to the environment. Engineering controls include enclosure or isolation of work areas resulting in asbestos dust; ventilation equipped with HEPA filters; and negative-pressure enclosure systems such as glove bag systems, wet removal, and use of leak-tight containers. The project would be required to notify the Bay Area Air Quality Management District (Regulation 11-2-401.3) prior to disturbing ACMs. Following removal, ACMs would be managed and disposed of as a hazardous waste in accordance with 22 CCR Division 4.5 regulations. As described in Section 2.7.7, Environmental Commitment HM-9 commits the project to adhering with these requirements when performing upgrades or removal of ACMs. These regulations and requirements provide for containment of ACMs such that unhealthful releases to the environment or levels of exposure by workers or the public would not be expected. Therefore, the hazard presented by asbestos removal during construction would be less than significant.

There is a potential for lead to exist throughout the proposed project site in the form of lead-based paint, piping materials, and other materials. Occupational exposures to lead can occur during construction activities such as plumbing system retrofits; the spraying, removal, or heating of paint that contains lead; and the welding, cutting, and grinding of lead-containing construction materials. Regulations under 8 CCR 1532.1 would govern the safe construction practices in the presence of lead-containing materials. Protective measures required by these regulations include, but are not limited to, training, personal protective equipment such as respirators and special clothing for workers, and required engineering controls and work practices to limit exposure to a safe level. In addition, per 8 CCR 1532.2, the project would be required to submit a Lead-work Pre-job Notification form to the nearest Cal OSHA Division District Office prior to lead-disturbing activities. As described in Section 2.7.7, Environmental Commitment HM-10 commits the project to adhering with these requirements. These regulations and requirements provide for containment of lead during removal work such that unhealthful releases to the environment or levels of exposure by workers or the public would not be expected. Therefore, the hazard presented by lead removal during construction would be less than significant.

The aforementioned 8 CCR 1511 OSHA worker protection regulations would require that the project construction plan incorporate adequate surveys and health and safety programs for workers for all of the hazardous materials that may occur at the site. Additional regulations governing the removal of ACM and lead would also apply where these hazards are encountered in construction. Hazardous wastes resulting from construction would need to be handled in accordance with 22 CCR

Division 4.5 which would prevent their release to the environment. With these measures, unhealthful levels of exposure by workers or the public, or releases to the environment, would not be expected; and therefore, potential for exposure to existing hazardous materials would be less than significant.

Mitigation Measure: No mitigation required.

Operational Impacts

Impact HM-3: Create a hazard to workers, the public, and/or the environment through the routine transport, use, and/or disposal of hazardous materials. (Less than significant.) Operation of the project would include transfer and storage of large quantities of petroleum products, the presence of which results in the potential for exposure of these hazardous materials to workers, the public, and the environment. Unsafe levels of exposure to workers or the public could cause health effects, and a release into the environment could cause harm to water resources, biological resources, and other ecosystem components. No discharge of hazardous materials to the environment would occur from routine activities, except for permitted emissions to air found to be less than significant with mitigation, as described in Chapter 4.0: Air Quality. Human health hazard information for crude oil and other products is summarized in Table 10-1.

Petroleum products would be contained in tanks or pipelines that would prevent exposure during routine operations but maintenance activities have potential to result in exposure to workers whenever oil is exposed.

Hazard rankings provided by the National Fire Protection Association (NFPA) for each handled product are provided in Table 10-1. NFPA uses a Health Hazard rating system of "0" to "4" as follows:

0 - No hazard beyond that of ordinary combustible material.

1 - May be irritating with only minor residual injury.

2 - Intense or continued, but not chronic, exposure could cause temporary incapacitation, or residual injury could occur if not treated.

3 - Exposure could cause serious injury even if treated.

4 - Exposure may be fatal.

Table 10-1: Product Hazard Summary

Material	Health Hazards	Hazard Rankings*
Crude oil (heavy and light)	• Irritant for skin and eye contact • Respiratory irritant if vapors inhaled • Toxic if ingested • Can be fatal following high-pressure skin injection or if aspirated into lungs • Acute inhalation hazard if hydrogen sulfide vapors occur in a high enough concentration (e.g., confined space) • May be carcinogenic following chronic exposure • Can cause organ damage or central nervous system disorders following chronic exposure	Fire: 4 Health: 2 Reactivity: 0
No. 6 Fuel Oil	• Irritant for skin and eye contact • Respiratory irritant if vapors inhaled • Low acute toxicity for ingestion • Can be fatal following aspirated into lungs • Acute inhalation hazard if hydrogen sulfide vapors occur in a high enough concentration (e.g., confined space) • May be carcinogenic following chronic exposure • Can cause organ damage or central nervous system disorders following chronic exposure	Fire: 2 Health: 2 Reactivity: 0
Gas Oil	• Irritant for skin and eye contact • Respiratory irritant if vapors inhaled • Low acute toxicity for ingestion • Can be fatal following aspirated into lungs • May be carcinogenic following chronic exposure • Can cause organ damage following chronic exposure	Fire: 2 Health: 1 Reactivity: 0

Material	Health Hazards	Hazard Rankings*
Vacuum Gas Oil	• Irritant for skin and eye contact • Respiratory irritant if vapors inhaled • Low acute toxicity for ingestion • Can be fatal following aspirated into lungs • May be carcinogenic following chronic exposure	Fire: 2 Health: 1 Reactivity: 0

*Rankings are from the National Fire Protection Association.

The highest NFPA health risk designation for products to be handled during project operations is 2. As defined above, in order to present a substantive health threat, an NFPA-rating of 2 requires intense or continued exposure to hazardous materials. In addition, as summarized in Table 10-1, acute (short-term) exposure to hazardous materials to be handled during project operations would typically not result in lasting health impacts. As described in Table 10-1, symptoms of acute over-exposure to hazardous products to be handled include irritation to the skin or eyes, or irritation to the respiratory tract if vapors are inhaled. Severe health effects from acute exposure are not typical except for extreme acute exposure, such as ingestion or aspiration into the lungs.

Excluding extreme exposure scenarios, the project's primary acute health hazard is related to the potential for exposure to hydrogen sulfide, which can occur at trace concentrations in some products. Hydrogen sulfide vapors are toxic, explosive, and heavier than air, and can be present in dangerous concentrations in confined spaces or other unventilated areas. While the acute health hazard of the products to be handled is generally low, chronic exposure can cause serious health effects. Chronic exposure to products containing hydrocarbons has been shown to cause serious health impacts, including increased cancer risk. However, Terminal and Rail Transload Facility workers, the public, and the environment would not be chronically exposed during routine operations as crude oil products would be enclosed in tanks, pipelines, and rail cars.

Small containers (i.e., 55 gallons down to one gallon or less) of hazardous materials such as lubricants, paints, adhesives and solvents would be used to maintain equipment during operations. OSHA regulations would prevent the exposure of unsafe levels of these materials to workers.

In addition, site maintenance could generate hazardous waste or recyclable hazardous materials. Management of hazardous waste onsite would be regulated under CCR Title 22. These Title 22 regulations for hazardous waste management would prevent unsafe levels of exposure to workers and the public and would prevent releases to the environment.

Hazards associated with crude oil transfer over water, either offshore or at the marine terminal, are addressed in Chapter 16.0: Marine Transportation and Marine Terminal Operations. This analysis evaluates other hazards presented by routine operations, which would be limited by adherence to the following laws, regulations, and requirements.

Occupational Safety and Health Regulations

As previously described in Impact HM-1, the project would be required to comply with Cal OSHA standards for worker safety in the handling and use of hazardous materials, including crude oil. 8 CCR Sections 337-340 require an employer to monitor work exposure to hazardous substances and notify workers of exposure to hazardous substances. The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substances exposure warnings. Cal OSHA regulations in 8 CCR 3203 would further require an IIPP for operations. The IIPP would specify protective clothing and gear to be used during task-specific activities, including work where exposure to hazardous materials could occur. The IIPP must include, in part: identification of the person or persons with authority and responsibility for implementing the program; a system for ensuring that employees comply with safe and healthy work practices; a system for communicating with employees in a form readily understandable by all affected employees; procedures for identifying and evaluating workplace hazards, including scheduled periodic inspections to identify unsafe conditions or practices; procedures for correcting unsafe conditions or practices; and training and instruction. 8 CCR 3208 requires recordkeeping of inspections and actions taken to prevent unsafe conditions or practices and of health and of health and safety training for each employee.

Pipeline Safety

The California Pipeline Safety Act, with oversight by the Office of the State Fire Marshal, regulates pipelines, including inspecting, testing, and investigating to ensure compliance with all state and federal safety laws and regulations. Per the California Pipeline Safety Act, pipelines would be designed to accommodate the passage of instrumental, internal inspection devices and would have leak mitigation and emergency response plans in place. These and other requirements of the California Pipeline Safety Act limit the potential for exposure to hazardous materials through safety precautions designed to minimize the potential for a release or upset condition.

Prior to operations, the pipeline system operators would be required to prepare and follow a manual of written procedures for providing safety during pipeline maintenance and normal operations, abnormal operations, and emergencies (49 CFR Part 195.402). The maintenance and normal operations section of the manual would include current maps and records and procedures for operating, maintaining, repairing, starting up, and shutting down the pipeline system; minimizing the potential for hazards; and implementing the applicable control room management procedures. The abnormal operations section addresses

scenarios in which the operating design limits have been exceeded and would include procedures for responding to, investigating, and correcting the cause of abnormal operations. The emergencies section of the procedure manual would identify procedures for prompt and effective response, assessing the area impacted by the hazard, and minimizing public exposure to injury. Safety-related condition reports must also be included in the procedures manual and include instructions enabling personnel who perform operation and maintenance activities to recognize potential safety-related conditions subject to the reporting requirements of 49 CFR 195.55.

The operator of the San Pablo Bay Pipeline would be required to prepare, implement, and maintain a Response Plan for an Onshore Oil Pipeline per 49 CFR 194. The Response Plan would include procedures and a list of resources responding, to the maximum extent practicable, to a worst-case discharge and to a substantial threat. The Response Plan would be consistent with the NCP and applicable ACPs. The Response Plan would identify environmentally and economically sensitive areas and address spill detection and mitigation procedures. Additionally, the plan would detail notification procedures, establish provisions to ensure the protection of safety at the response site, identify training and equipment-testing procedures, and contain a drill program in accordance with the PREP guidelines. Prior to operations, the Response Plan would be submitted and approved by the Office of Pipeline Safety, Pipeline and Hazardous Materials Safety Administration, DOT (49 CFR 194.119).

California Aboveground Petroleum Storage Act

The California Aboveground Petroleum Storage Act requires the owner or operator of a petroleum storage facility with an aggregate aboveground storage capacity greater than or equal to 1,320 gallons to prepare and implement a SPCC Plan in accordance with 40 CFR Part 112. It also requires the CUPAs to conduct inspections at tank facilities with an aggregate storage capacity of 10,000 gallons or more of crude oil or refined petroleum products at least every three years. The purpose of the inspection is to determine whether the owner or operator is in compliance with the SPCC Plan requirements of the Aboveground Petroleum Storage Act. The Aboveground Petroleum Storage Act requires the owner or operator of a tank facility to annually file a tank facility statement with the Certified Unified Program Agency. The submittal of a business plan satisfies the requirement to submit the tank facility statement. The Aboveground Petroleum Storage Act also requires each owner or operator of an aboveground storage tank facility to immediately report, upon discovery, to the Governor's Office of Emergency Services and the CUPA, the occurrence of a spill or release of 42 gallons or more of crude oil or refined petroleum products. The project would be required to comply with all requirements of the California Aboveground Petroleum Storage Act for all on-site storage tanks, including preparation of a SPCC Plan and a HMBP prior to operations. These regulations and requirements, coupled with ongoing inspection by the CUPA, would limit the risk of spill or release of that could result in exposure to workers, the public, or the environment.

Hazardous Materials Management Act

Federal and state regulations require any business that handles more than a specified amount of hazardous or extremely hazardous materials, termed a "reportable quantity," to submit a HMBP to its CUPA. HMBPs must include an inventory of the types, quantities, and locations of hazardous materials at the facility. Businesses are required to update their business plans at least once every three years and update the chemical portion of their plans every year and within 30 days of a substantial change in usage of hazardous materials. Also, HMBPs must include an Emergency Response Plan and procedures to be used to prevent, and abate hazards the in the event of a release or threatened release of a hazardous material. The HMBP must identify all appropriate agencies that must be notified immediately of a release, identify local emergency medical assistance, include contact information for all company emergency coordinators, a list of emergency equipment at the business, an evacuation plan, and a training program for business personnel. The training program must incorporate safety and response measures for handling of hazardous materials, including methods for safe handling; responsibilities of facility staff responding to an incident; coordination with local emergency responders; use of emergency response equipment; and mitigation, prevention, and abatement of hazards to persons, property, and the environment. Businesses that handle hazardous materials are required by law to provide an immediate verbal report of any release or threat of release of hazardous materials if there is a reasonable belief that the release or threatened release poses a present or potential hazard to human health and safety, property, or the environment. These regulations and requirements would limit the risk of a spill or release that could result in exposure to workers, the public, or the environment.

Spill Prevention, Control, and Countermeasure Plan

The project oil storage facilities would be required to operate in accordance with the requirements of 40 CFR Part 112 to prevent the release of stored crude oil. As such, the project would operate under a SPCC Plan to implement oil spill prevention and response preparedness measures. The SPCC Plan would include 40 CFR Part 112 requirements for safe oil handling for routine operations designed to prevent releases of liquid substances, and to minimize the effects of releases should a release event occur. These regulations and requirements would limit the risk of a spill or release that could result in exposure to workers, the public, or the environment.

Conclusions

The laws and regulations described above would limit the potential for release and exposure resulting from the routine use, transport, or disposal of these materials during project operations. OSHA regulations would limit the potential for exposure to project workers to safe levels for all hazardous materials present in the workplace. Additionally, hazardous wastes generated would be managed under California Code of Regulations Title 22 requirements designed to protect the public and the environment. Federal and state pipeline safety regulations and aboveground petroleum storage regulations include extensive requirements for

safe operation and spill prevention that would prevent unsafe levels of exposure to the public or the environment for routine operations. With adherence to these existing regulatory requirements, unsafe levels of exposure to workers or the public, or releases that could do substantial harm to the environment would not be expected to result from routine operations. Considering these factors, the hazard presented by routine use, transport and disposal of hazardous materials by the project would be less than significant.

Mitigation Measure: No mitigation required.

Impact HM-4: Create a hazard to the public or environment through reasonably foreseeable upset or accident conditions involving the release of a hazardous material to the environment. (Significant and unavoidable.) The probability and potential consequences of an upset or accident condition resulting from operation of tanks, pipelines, the Rail Transload Facility, or rail transport and the resulting hazard risk are evaluated below. The hazard due to an upset or accident condition from oil transfer over water, either offshore or at the marine terminal, is evaluated in Chapter 16.0: Marine Transportation and Marine Terminal Operations.

Tanks

The tank farms included in the proposed project are described in detail in Chapter 2.0: Proposed Project and Alternatives and include the East Tank Farm (Tanks 1 through 6) and the South Tank Farm (Tanks 8 through 17). Tanks located in the East Tank Farm are individually surrounded by approximately 15-foot-tall secondary containment walls consisting of 8-inch-thick reinforced concrete. Tanks 9, 15, and 16 in the South Tank Farm have individual containment structures consisting of sloped grading and earthen berms. The remainder of the tanks in the South Tank Farm would be secondarily contained within the stormwater retention basin. Each containment feature has a manually operated outfall valve, or sump pump. The secondary containment berms and walls and the stormwater retention basin would be sufficient to provide the secondary containment volume required by 40 CFR 112.7(c) and would be capable of containing a volume equal to the contents of at least an entire tank plus precipitation from the 25-Year, 24-Hour storm event pursuant to 40 CFR 112.8(c)(2). Regulations require that secondary containment area valves remain closed, and pumps removed or turned off with controls secured, except when rainwater is being drained after inspection, to ensure no oil is discharged.

Relevant regulations and standards for petroleum storage safety and published studies on bulk storage accidents were reviewed and considered as part of the preparation of this section (referenced in Section 10.3). In addition to 40 CFR 112 regulations, the following regulations and standards would be required as part of the project design in order to limit the risk of releases from bulk petroleum storage tanks:

- American Petroleum Institute (API) Recommended Practice (RP) 570 Piping Inspection Code for in service inspection, rating, repair and alteration of piping systems
- API Standard Practice (SP) 650 for design of welded steel tanks for petroleum storage
- API RP 651 for cathodic protection of aboveground petroleum storage tanks
- API RP 652 for lining petroleum storage tank bottoms
- API SP 653 for inspection, repair, alteration and reconstruction of petroleum storage tanks
- API RP 1104 for welding of pipelines and related facilities
- API SP 2000 for venting petroleum storage tanks
- API RP 2001 for fire control and extinguishment equipment and systems
- API RP 2003 for protection against ignitions from static electricity, lightning and stray current
- API SP 2210 for design of flame arrestors for petroleum storage tank vents
- API RP 2350 for over-fill protection for petroleum storage tanks
- NFPA 11 for fire control and extinguishment equipment and systems
- NFPA 30 flammable and combustible liquid code
- NFPA 51B fire prevention in the use of cutting and welding processes
- NFPA 69 standards on explosion prevention systems
- NFPA 70 National Electric Code
- NFPA 77 Static Electricity
- NFPA 78 Lighting Protection Code
- 29 CFR 1910.119 Process Safety Management Standards
- 29 CFR 1910.252 OSHA Standards for Welding, Cutting and Brazing
- California Building Code
- California Fire Code
- California Electric Code

With adherence to these requirements, the probability that a tank facility handling crude oil and partially refined crude oils would have a serious incident (i.e., an incident causing lasting health effects or substantial environmental damage) within its lifetime is very low. However, industry-wide experience shows that releases from bulk storage tanks will continue to occur in statistically low frequency events. This section identifies the potential consequences and probabilities of a range of releases from the project bulk storage tanks and evaluates the associated risk. None of the consequences described in this chapter are proposed as part of the project; rather, they are evaluated only for consideration of possible upset or accident scenarios.

Common Causes of Releases from Tanks

Bulk storage tank accident analysis is a topic that has been widely studied as a result of the potential for significant impacts to human health and the environment and economic losses and liability. Fire, explosion, and equipment failure are the dominant causes of major releases from bulk storage tanks and account for the vast majority of major bulk storage tank accidents.

Fire and Explosion

Causes of past releases from bulk storage tanks worldwide have dominantly been related to fire or explosion. A study of 242 bulk storage tank releases occurring between 1960 and 2003, including 105 facilities in the United States, determined that 85 percent of accidents involved one or both of these hazards (Chang and Lin, 2006). Lightning was the most common root cause (33 percent of incidents). Lightning can cause damage or incident to a petroleum storage tank either through a direct strike or a nearby strike that can cause changes in ground potential and arcing at the tank if grounding is inadequate to disperse the charge. The tanks would be designed in accordance with API standards and NFPA requirements and would be expected to withstand a typical direct or nearby lightning strike scenario without incident. However, incidents are possible if arcing occurs in the presence of petroleum vapors in the flammable concentration range (for example, if arcing occurs at a tank with a floating roof seal that has not been properly maintained). Such incidents can range from a relatively small fire (e.g., fire at a floating roof seal) that can typically be controlled without major loss of product or environmental impacts, to a large fire or explosion and tank failure with significant environmental damage, and potentially serious injuries or loss of life. A fire that may result from a lightning strike would most likely be a "rim fire" on the seal of an external floating roof tank. These types of fires can be readily extinguished with standard fire suppression measures and equipment without major incident (Shelley, 2008). The project is designed with internal floating roofs on all bulk storage tanks with grounding of the shell, roof and pan, consistent with API standards and NFPA requirements. The internal floating roof design substantially reduces the likelihood of a lightning strike resulting in a fire, release, or other related tank damage compared to external floating roof tanks. The internal floating roof tank design is a conservative (high safety factor) design for the types of petroleum products to be handled by the project. Internal floating roof tanks are typically used to store much higher flammability refined products such as gasoline.

The project region is not a high lightning risk area. It has among the lowest lightning strike probabilities of any land area in the world except Antarctica (Geological Society of America, 2013). Worldwide, lightning frequency is lowest near the North and South Poles and over the oceans; and highest in warm continental areas at low latitudes. The project area's latitude, proximity to the ocean, and Mediterranean climate make it a low-frequency lighting strike area compared to most lands on earth. Lightning data from the U.S. National Lightning Detection Network (VAISALA, 2012) indicates a lightning flash density between 0 and 0.25 flashes per square kilometer per year on average for the five-year period of 1996 to 2000. For comparison, the highest lightning flash density in the continental United States is recorded in Florida, with a density more than 60 times greater than the project area. Furthermore, the probability of a fire or release incident resulting from a direct or nearby lightning strike is likely to be considerably lower than even what has been indicated by published studies described in this analysis. This is because of the conservative tank design

proposed for the types of products to be handled and updated current design standards. While a fire or release incident during the project life is possible due to a direct or nearby lightning strike, the statistical probability is likely to be very low. The project's storage tank internal floating roof design, grounding design (in accordance with current standards), and relatively low density of lightning strikes in the project area substantially limit the potential for a lightning strike near the project that could then result in a fire or release of product.

Next to lightning, the most common root cause of fire- and explosion-related releases from bulk storage tanks is a result of human error (30 percent of incidents studied by Chang and Lin, 2006). Tank overfilling and maintenance errors involving welding and mechanical friction (e.g., grinding) are dominant causes of those releases. Tank overfilling can cause releases from the affected tank into secondary containment. Overfilling releases can allow flammable vapors to occur where they are not intended, potentially reaching sources of ignition if present. Welding can provide a source of ignition for flammable vapors, if performed in an unsafe atmosphere, as can sparks from grinding, electric tools, or other energy sources. These mechanisms are considered human error because these are preventable hazards, and regulations and standards are in place to ensure that adequate precautions are implemented to safeguard against these hazards. These types of human error result from important safety procedures being overlooked by operators or maintenance workers. Controls in place to ensure that human error risk is minimized for the project include adherence to the following regulations and standards:

- API RP 2350 for over-fill protection for petroleum storage tanks
- NFPA 30 Flammable and Combustible Liquid Code
- NFPA 51B fire prevention in the use of cutting and welding processes
- 29 CFR 1910.119 Process Safety Management Standards
- 29 CFR 1910.252 OSHA Standards for Welding, Cutting and Brazing
- OSHA confined space regulations at 29 CFR 1910.146
- California OSHA confined space regulations at 8 CCR 5157

Equipment Failure

Studies of past bulk storage tank incidents have identified bulk storage tank releases from equipment failures, including sunken floating roofs, tank cracks and ruptures, line leaks and ruptures, valve failures, heater malfunctions, and thermostat failures.

Most sunken roof releases occur from the exposure of an external floating roof to storm elements. The combination of an external fixed roof and an internal floating roof included in the proposed project design protects an internal floating roof from the elements, making it substantially less likely to result in a release of product.

Cracks can occur in tanks from fatigue, seismic motions, or settlement, and occur most often at the bottom or the welding edges. Tank bottoms, shells, and roofs are also subject to corrosion on both internal and external surfaces. Contact with underlying soil can corrode tank bottoms, and contact with the atmosphere can corrode the outer surface of tank shells and roofs. Inner surfaces of tank shells, roofs, and bottoms are subject to corrosion from corrosive components in the stored petroleum product, including water and hydrogen sulfide. Cracks and corrosion can be detected and monitored by focused inspections in accordance with API procedures. Tanks 10, 11, 12 and 14 would be newly constructed using a construction quality assurance/quality control (QA/QC) program to ensure that there are no construction defects that could result in a release. The remaining project tanks that would be retrofitted would be inspected and returned to service following API SP 653 for inspection, repair, alteration and reconstruction of petroleum storage tanks. This SP lays out rigorous inspection and repair requirements designed to ensure that the tanks are in good condition to return to service. The construction QA/QC and API SP 653 inspection and repair items would ensure that the tanks are fit for use before being placed in service. As a final check, tanks would be integrity tested with water before being placed in service. Following placement in service, periodic inspections and maintenance would occur following requirements of API SP 653 to ensure continued tank integrity, including temporarily removing tanks from service, removing contents, cleaning, and degassing the tank to allow completion of an API SP 653 inspection. The API SP 653 inspection includes:

- Checklist review of conformance to API SP 653 and best industry practices
- Checklist review confirming physical condition of the tank and changes from the baseline design, including overall settlement of the tank and physical dimensions
- Visual review of the condition of the tank foundation, coating/paint, bottom, shell, roof, nozzles, connecting piping, sumps and other tank appurtenances
- Test (e.g., magnetic flux or ultrasonic testing) showing the remaining wall loss on the tank bottom and shell and other critical areas
- Development of a detailed report describing methods, results of the inspections and testing and recommendations on repairs or modifications

After inspection, contractors specializing in tank maintenance would complete the repairs recommended by the API SP 653 inspection prior to the tank being returned to service.

40 CFR 112 regulations also require periodic integrity testing of bulk petroleum storage tanks. Inspection, integrity testing and maintenance performed in accordance with 40 CFR 112 requirements and API SP 653 standards would limit the probability of an equipment failure resulting in a release from the project storage tanks.

Natural Disasters

Natural disasters are not a statistically common cause of bulk storage tank releases. Only 3 percent of the bulk storage tank releases studied by Chang and Lin (2006), were attributable to natural disasters. Natural disasters that have resulted in bulk storage tank accidents include earthquakes and hurricanes. The project site is located in a seismically active area. While tank design engineering would include consideration of maximum wind loads, seismic loading is expected to control the structural design of the tanks such that they would exceed the required design for wind resistance for this project location. Whether or not a given bulk storage tank may be damaged by seismic motion is dependent on a number of factors including seismic motions, ground conditions, tank structure, and the amount and type of material in the tank when the motions occur. New project tanks would be constructed to meet current seismic safety standards. Existing tanks to be retrofitted would also be confirmed to meet current seismic design standards. The maximum product volume stored in the tanks would be limited through administrative controls if necessary to ensure conformance with current seismic design standards. A study commissioned by the U.S. National Institute of Standards and Technology concluded that, in general, bulk storage tanks perform reasonably well in earthquakes, particularly tanks with diameter to height ratios (d/H) of greater than 2 (Cooper, 1997). The bulk storage tanks proposed for use by the project have d/H ratios of more than 3, except for the smallest tank (Tank 17, capacity of 54,000 BBLs) with a d/H ratio of 1.8.

Tank Release Impact Scenarios

Releases from bulk storage tanks can result in events ranging from a small spill within secondary containment that is easily controlled without major loss of product or serious environmental impacts, to a major event with explosion or fire with failure of a tank or tank farm with significant environmental damage, loss of product and potentially loss of life. To assess the risk posed by the project, both the consequences and probability of potential events must be considered.

Relatively minor release events could potentially occur with some frequency without posing a significant hazard to human health or the environment because of their minor consequences. Conversely, larger releases may pose a significant hazard even for a one-time event.

Probabilities for a range of release event magnitudes from published bulk storage tanks release studies are provided in Table 10-2, ranging from minor leaks to complete failure and fire.

Table 10-2: Tank Release Scenario Probabilities

Scenario	Probability Tank Year	Source
Minor Release	2.5×10^{-3}	U.K. Health and Safety Executive, 2012
Major Release	1×10^{-4}	Resource Protection International, 1997
Minor Release With Fire	9×10^{-5}	Resource Protection International, 1997
Major Release With Fire	6×10^{-6}	Resource Protection International, 1997
Complete Tank Failure	5×10^{-6}	(Ash, 2012; U.K. Health and Safety Executive, 2012)

Minor Release

Minor releases are estimated to have a probability of occurrence of 2.5×10^{-3} per tank-year. The probability of 2.5×10^{-3} per tank-year means that for any one bulk oil storage tank, a minor release event could be expected to occur 2.5 times for every hypothetical 1,000 years of operation of that individual tank, which is an average of one minor release event every 400 years for any one tank. Expressed another way, it means that the event has a 1 in 400 probability of occurring during any given year at any one tank. Because the proposed project includes a total of 16 bulk oil storage tanks that could potentially spill, the probability of such an event happening at the overall storage terminal is the sum of the probability of each of the 16 tanks, resulting in a probability of approximately 16 in 400 (i.e., 1 in 25) that the event could occur in any given year of the project. This is a high probability and indicates that a minor release is a reasonably foreseeable upset condition for this project.

Project storage tanks would be within secondary containment that would prevent minor releases from leaving the project site or impacting sensitive natural resources. Cleanup work would occur pursuant to requirements of the applicable jurisdictional agencies, including, but not limited to, OSHA regulations that would limit cleanup worker exposure to hazardous constituents to a safe level. Spilled product would be cleaned up and no significant long-term impacts or impacts to sensitive resources would be expected. Therefore, hazard to the public and the environment of minor releases would be less than significant.

Major Release

Major tank failures are estimated to have a probability of occurrence of 1×10^{-4} per tank-year. This means that for any one bulk oil storage tank, a major release event could be expected to occur once for every hypothetical 10,000 years of operation of that individual tank. Expressed another way, it means that the event has a 1 in 10,000 probability of occurring during any given year at any one tank.

Because the proposed project includes a total of 16 bulk oil storage tanks that could potentially spill, the probability of such an event happening at the overall storage terminal is the sum of the probability of each of the 16 tanks, resulting in a probability of approximately 16 in 10,000 (i.e., 1 in 625) that the event could occur in any given year of the project. Because 625 years is a long time compared to the life of project facilities, this event is unlikely to occur. While unlikely to occur, this hypothetical scenario is considered a reasonably foreseeable upset condition for analysis under CEQA.

Project storage tanks would be located within secondary containment areas that would contain a major release without oil impacting offsite locations or sensitive natural resources. However, a major release could result in a large product pool within secondary containment and could take days or weeks to remediate. Cleanup work would occur pursuant to requirements of jurisdictional agencies. OSHA regulations would limit cleanup worker exposure to hazardous constituents to a safe level. The release would be within the secured project site (see Section 2.5.7, Lighting and Security) so there would be no direct exposure to the public or sensitive environmental resources. While spilled product would be cleaned up, if the spilled product pool is large, areas adjacent to the site could potentially be impacted by vapors until the spilled product is recovered or other measures are implemented for vapor control. For the major spill scenario, the spilled product pool could be large and unsafe levels of vapors could potentially occur offsite under some meteorological conditions. In addition, if the pool is large it could present an imminent risk to adjacent areas due to its flammability. Offsite areas adjacent to the project may need to be evacuated until vapors and any imminent threat of ignition are controlled. As described in Section 2.7.7, Environmental Commitment HM-11 commits the project to being part of the Community Warning System (CWS) to alert the public in the event of an imminent hazard to public health. The CWS, operated by the CCCFPD and the Contra Costa County Sheriff's Department (CCCSD), is an early warning system in place to notify the community of an industrial hazardous material release. If a release occurred that was great enough to pose a threat to the community, sirens would alert persons in the area to the emergency so that they could take action to protect themselves such as to leave the area or shelter in place. The CWS also has capabilities to broadcast alerts via television and radio if necessary. Nevertheless, considering that unsafe conditions could occur in adjacent public and residential areas offsite in the short term, if a major release occurred within secondary containment it would present a significant hazard. This risk would be significant and unavoidable. Mitigation Measures HM-1, HM-2 and HM-3 would help to minimize the probability of occurrence of a major release from a project tank, thereby minimizing the hazard.

Various storage tank accident studies have concluded that most accidents can be avoided if applicable requirements and standards are adhered to (Cornell and Baker, 2002, Chang and Lin, 2006). Mitigation Measures HM-1, HM-2, and HM-3 would provide the City direct assurance beyond existing regulations that critical

design and operations standards for prevention of upset conditions are implemented, as required. Furthermore, Mitigation Measure HM-4 would require the applicant to develop a stakeholder communication plan that would, in part, ensure rapid implementation of and appropriate response to the CWS if an upset event were to occur that poses an immediate threat to the public or the environment.

Minor Release and Fire

A minor release with a fire is estimated to have a probability of occurrence of 9×10^{-5} per tank-year. This means that for any one bulk oil storage tank, a major release event could be expected to occur nine times for every hypothetical 100,000 years of operation of that individual tank. Expressed another way, it means that the event has a 1 in 11,000 probability of occurring during any given year at any one tank. For the project as a whole, which includes 16 project bulk storage tanks, the probability of a minor release with a fire is approximately 16 in 11,000 (i.e., 1 in 690) in any given year. Because 690 years is a long time compared to the life of project facilities, this event is unlikely to occur. While unlikely to occur, this hypothetical scenario is considered a reasonably foreseeable upset condition for analysis under CEQA.

A minor release and fire would be within secondary containment that would prevent product released from leaving the project site or impacting sensitive natural resources. Toxic combustion byproducts such as naphthalene, polycyclic aromatic hydrocarbons, sulfur dioxide, carbon dioxide, carbon monoxide, nitrogen oxides, and volatile organic compounds could be formed and released into the air from a fire, along with particulates such as metals and soot. Under most atmospheric conditions, the thermal plume would transport most emissions upward and away from the site where they would be dispersed into the atmosphere to concentrations that would not pose an immediate health hazard. Depending on the location of the hypothetical minor release and fire within the tank farms and meteorological conditions, some offsite locations adjacent to the project may be impacted by combustion emissions at unhealthful concentrations. In addition, a minor release and fire could present a significant hazard if it were to escalate. Offsite areas adjacent to the project may need to be evacuated until any imminent threat is controlled. Considering these factors, the hypothetical minor release with fire would present a significant hazard if it were to occur. This hazard would be significant and unavoidable. Mitigation Measures HM-1 through HM-3 would help to minimize the probability of occurrence of an upset event from a project tank, thereby minimizing the hazard. Mitigation Measures HM-1 through HM-3 were developed given the principle that various storage tank accident studies have concluded that most accidents can be avoided if applicable requirements and standards are adhered to (Cornell and Baker, 2002, Chang and Lin, 2006). Mitigation Measures HM-1, HM-2, and HM-3 would provide the City direct assurance beyond existing regulations that critical design and operations standards are implemented for prevention of upset conditions. Furthermore, Mitigation Measure HM-4 would require the applicant to develop a stakeholder

communication plan that would, in part, ensure rapid implementation of an appropriate response to the CWS if an upset event were to occur that poses an immediate threat to the public or the environment.

Major Release with Fire

A major release with fire could involve all or a portion of the respective tank secondary containment area. Even though the project tanks would be within secondary containment designed with capacity to hold more than 100 percent of the tank contents, under worst-case conditions a major release and fire could potentially result in a release of product from secondary containment and associated significant impacts on affected areas. Significant short-term air pollution could also occur from combustion byproducts. Toxic combustion byproducts such as naphthalene, polycyclic aromatic hydrocarbons, sulfur dioxide, carbon dioxide, carbon monoxide, nitrogen oxides, and volatile organic compounds could be formed and released into the air from a fire, along with particulates such as metals and soot. A major release and fire could burn for days. Under most atmospheric conditions, the thermal plume would transport emissions upward and away from the site where they would be dispersed into the atmosphere. Temporary ground-level unhealthful air quality conditions and/or property damage from particulate fallout could occur in localized areas. Thermal radiation from fire would also be a significant hazard. The hypothetical major release and fire scenario, if it were to ever occur, could represent an imminent threat to health, safety and the environment in nearby areas and evacuation would likely be required. Adjacent residential areas and nearby wildlife and water resources could be impacted. Significant harm could occur to persons and property present in harm's way.

An FRP would be prepared and implemented prior to operations in accordance with 40 CFR 112. The FRP is required due to the facilities storage capacity and proximity to waters and would ensure that response resources and preparation for the worst-case spill are in place, including evidence of a contract with an OSRO or other evidence ensuring availability of required response personnel and equipment. As described in Section 2.7.7, Environmental Commitment HM-12 commits the project to complying with FRP requirements. The FRP is designed, in part, to demonstrate a facility's preparedness to respond to an oil release. Planned response measures are required to ensure capabilities of responders such as OSROs and the CCCFPD for control and cleanup of the worst-case release.

A major release with a fire is estimated to have a probability of occurrence of 6×10^{-6} per tank-year. This means that for any one bulk oil storage tank, a major release event could be expected to occur six times for every hypothetical 1,000,000 years of operation of that individual tank. Expressed another way, it means that the event has a 6 in 1,000,000 probability of occurring during any given year at any one tank. Calculating this to account for all 16 project bulk storage tanks, a major release with a fire has the probability of occurring approximately 96 times in 1,000,000 (i.e., 1 in 10,400) in any given year of the

project. Because 10,400 years is orders of magnitude longer in time than the project, this scenario is not a reasonably foreseeable upset condition for CEQA analysis.

Complete Tank Failure

Complete failure of bulk storage tanks with 100 percent of contents released is rare but can occur, for example, as a result of fire, explosion, material failure, or natural disaster. Complete tank failure can result in product surge that can damage or overtop secondary containment and release product to the environment with associated significant impacts on affected areas. If fire is associated with the complete failure, it would result in significant short-term air pollution from combustion byproducts. A complete tank failure with fire could burn for days with impacts similar to those previously described for a major release with fire. The complete tank failure release scenario could represent an imminent threat to health, safety and the environment in nearby areas. Adjacent residential areas and nearby wildlife and water resources could be significantly impacted. Significant harm could occur if persons are present in harm's way.

An FRP would be prepared and implemented prior to operations and would ensure that response resources and preparation for the worst-case spill are in place, including evidence of a contract with an OSRO or other evidence ensuring availability of required response personnel and equipment. The FRP is designed, in part, to demonstrate a facility's preparedness to respond to an oil release. Planned response measures are required to ensure capabilities of responders, such as OSROs and the CCCFPD, for control and cleanup of the worst-case release.

A complete tank failure is estimated to have a probability that is lower but similar order of magnitude to that previously described for the major release with fire (refer to Table 10-2). Considering the extremely low probability, this scenario is not a reasonably foreseeable upset condition for CEQA analysis.

Tank Hazard Summary

A summary of tank release impact scenarios described in the preceding paragraphs is provided in Table 10-3.

Pipelines

Project operations would involve the reactivation of the existing approximately 13-mile long San Pablo Bay Pipeline, construction of a new approximately 0.42-mile long KLM Pipeline connection, and construction of a new approximately 0.56-mile long Rail Pipeline. Reactivation of the San Pablo Bay Pipeline would transition the pipeline from 'out-of-service' to 'active.' To do so, the pipeline owner would be required to submit a written plan describing the process to be used to demonstrate the integrity of the pipeline to the SFM for review and approval prior to operations (Gorham, 2011). An inspection of the pipeline and pipeline records would be conducted by the SFM to determine compliance with

Table 10-3: Tank Release Impact Scenario Summary

Scenario	Consequences	Probability	Likelihood	Significance Level
Minor Release	Less than Significant	1 in 25 chance/project year	Likely during the project	Less than Significant
Major Release	Potentially Significant	1 in 625 chance/project year	Unlikely during the project	Significant
Minor Release With Fire	Potentially Significant	1 in 690 chance/project year	Unlikely during the project	Significant
Major Release With Fire	Potentially Significant	1 in 10,400 chance/project year	Not reasonably foreseeable	Less than Significant
Complete Tank Failure	Potentially Significant	1 in 12,500 chance/project year	Not reasonably foreseeable	Less than Significant

state and federal pipeline regulations (SFM, 2009). As described in Section 2.7.7, Environmental Commitment HM-13 commits the project to demonstrate the integrity of the San Pablo Bay Pipeline prior to its operation.

Project pipeline operations would be required to comply with California Government Code Chapter 5.5 and DOT Title 49 CFR Part 195 regulations, which call for regular integrity testing, training, corrosion control, qualifications of pipeline personnel, and other measures to minimize the potential for a release from pipelines, and recordkeeping and reporting to ensure compliance. Additionally, 49 CFR Part 195.402 would require pipeline operators to prepare a procedure manual for maintenance and normal operations, abnormal operations, emergencies, and safety-related condition reports, as discussed in Impact HM-3. As described in Section 2.7.7, Environmental Commitments HM-14 and HM-15 commit the project to complying with these requirements.

Regardless of the laws and regulations in place that would limit the potential for a release of crude oil from project pipelines under routine operations, this analysis considers that an accidental release from a project pipeline is possible. The most likely causes of accidental releases from crude oil pipelines are corrosion, third-party damage, and equipment malfunction (SFM, 1993).

Pipeline Release Volume Scenarios

For purposes of this analysis, potential pipeline releases are classified as either an accidental leak or an accidental rupture. Accidental leaks, defined as a point of corrosion or other failure up to 1 inch in diameter, have low release rates that may even be small enough to escape detection for an extended period, whereas accidental ruptures result in substantial release rates that would be quickly identified by pipeline operations Supervisory Control and Data Acquisition (SCADA) monitoring such as severing of a pipe by third-party activities or seismic events (CDE, 2007).

Project pipelines are in segments, with each segment separated by a break valve that can be used to isolate any given segment from adjacent segments. Project pipeline segments are identified and detailed in Table 10-4 and illustrated on Figure 10-3: Shell Pipeline Segments, Figure 10-4: Proposed Pipeline Connections, and Figure 10-5: On-site Header Pipeline Segments. In the event of an accidental rupture, the pipeline leak-detection system would detect the rupture and activate an alarm to notify the operator of the condition. The operator would immediately halt pumping operations, and activate automated closure of the break valves. Rupture response times listed in Table 10-4 reflect the estimated total time for the SCADA system to detect the rupture, the operator to activate the break valves, and the valves to fully close. Through this process, a pipeline segment, bounded by two break valves, would be isolated from the rest of the pipeline. As a result, the volume of the potential release would be limited to that in the ruptured pipeline segment while contents in the remainder of the pipeline segments would be contained.

Because leak-detection response times, maximum flow rates, pipe diameters, and the distance between break valves (lengths of segments) vary, each segment has a different reasonable rupture spill volume (see Table 10-5). For a pipeline rupture, the scenario involves a release of the oil pumped plus the total contents of a single segment, where the release volume is calculated as follows:

Volume = *(pipe cross-sectional area)* x *(segment length)*
+ *(maximum operating flow rate)* x *(leak-detection response time)*

For leak events, a leak volume of 100 BBLs (4,200 gallons) of crude oil is used for this analysis, based on data derived from California Department of Education (CDE) and SFM publications. The CDE Guidance Protocol for School Site Pipeline Risk Analysis (CDE Protocol) estimates that 20 percent of all releases are classified as "ruptures" (CDE, 2007), and the SFM Hazardous Liquid Pipeline Risk Assessment (SFM, 1993) concludes that 18 percent of releases have a volume of 100 BBLs (4,200 gallons) or more. Therefore, in this analysis 100 BBLs was used as the dividing point between "leak" and "rupture" release categories in this analysis based on the close correlation of these percentages.

Pipeline Release Probability

The CDE approximates that the overall probability of a release occurring along any crude oil pipeline in California is 0.0023 release incidents per mile-year. This value was developed from historical release data for crude oil pipelines in the state of California (CDE, 2007). Based on this probability for total releases, a probability of leak and release incidents per year was approximated for each pipeline segment (see Table 10-5). Releases of oil from project pipelines classified as ruptures (estimated 20 percent of total releases) have a higher associated release volume and a significantly lower frequency compared to pipeline leaks (estimated 80 percent of total releases). As shown in Table 10-5, the probability of a rupture event for each pipeline segment expressed as a return period ranges from once every 290 years to once every 33,000 years. The probability of a leak event for each pipeline segment expressed as a return period ranges from once every 73 years to once every 9,090 years.

Crude oil pipelines constructed after 1960 have a substantially lower incident rate than pipelines constructed prior to 1960 (CSFM, 1993). Newer pipelines tend to have substantially lower incident rates, which may be attributable to generally lower operating temperatures and modern coatings that provide superior external corrosion protection, compared to older pipelines. The KLM Pipeline connection and the Rail Pipeline would be newly constructed, while the San Pablo Bay Pipeline was built in 1975. However, the San Pablo Bay Pipeline is coated with a two-inch thick polyurethane foam layer and polyethylene jacket and would typically be operated at ambient temperature for project operations. Utilizing modern designs and operating procedures and current regulatory requirements, the project pipelines are likely to have a substantially lower probability of incident than indicated by the CDE pipeline incident database used in this analysis. For this reason, the statistical probabilities of incident scenarios described for pipelines in this section are likely to be conservative (i.e., overestimated).

Potential Hazards

In the event of an oil release from a project pipeline, released material would impact soil, and could impact shallow groundwater or surface water. Crude oil and partially refined crude oil products to be handled by the project contain relatively low concentrations of volatile constituents compared to gasoline and most other refined fuels and natural gas. Therefore, a spill is much less likely to produce vapors in the explosive range at a potential source of ignition compared to most refined fuel products and natural gas. Also, as described in Impact HM-3, the petroleum products to be handled generally are only acutely toxic to humans under extreme exposure scenarios (e.g., injection, ingestion, or aspiration) or if hydrogen sulfide is present in a confined space or other non-ventilated atmosphere. If an oil release from a pipeline were to be discovered, it is expected that the area could be secured to prevent contact with released oil by the public. Regulations and infrastructure would be in place to ensure rapid response, containment and cleanup of a release, including requirements for an FRP for

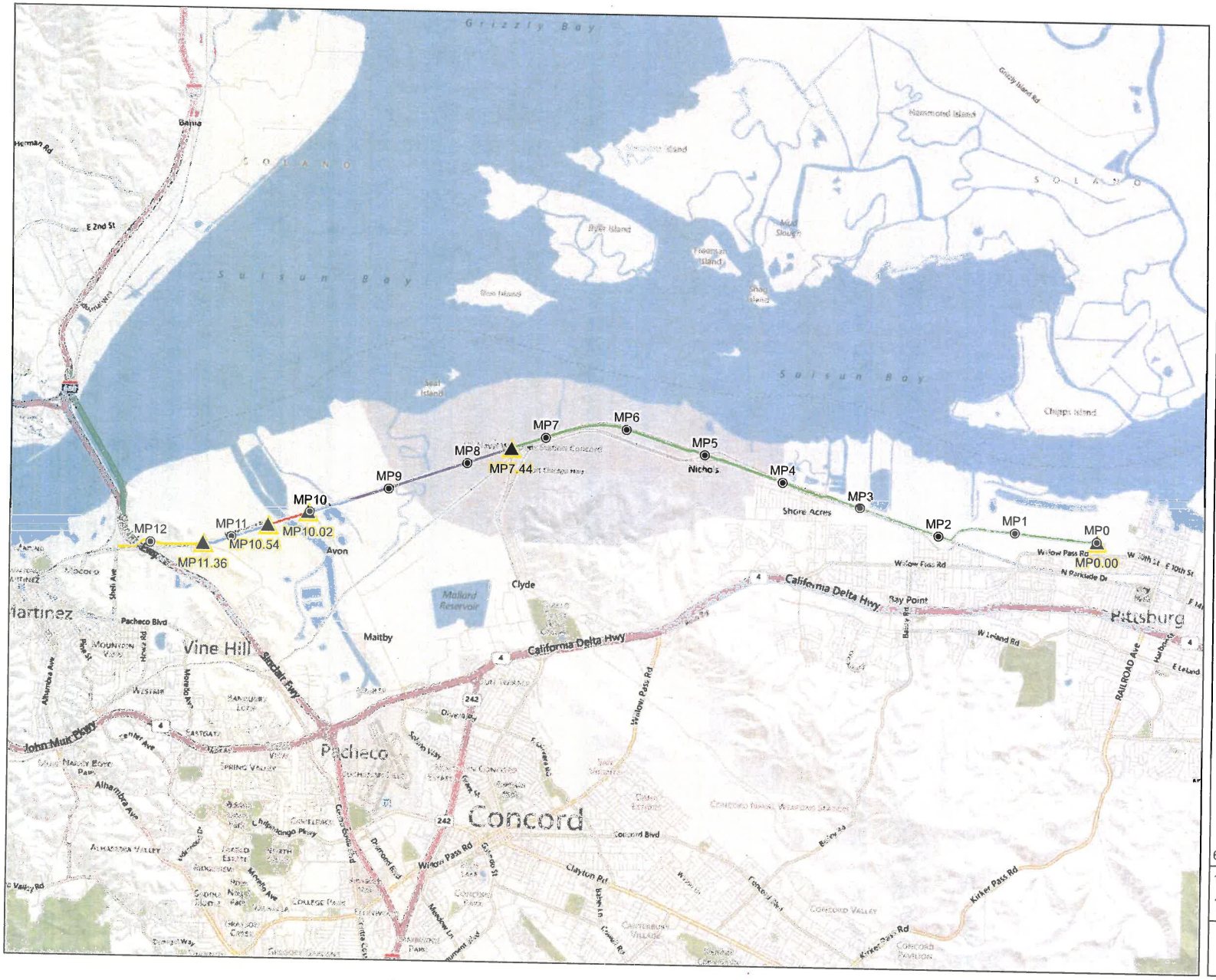


Figure 10-3
Shell Pipeline Segments
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

- Mileposts
- Break Valves
- Shell 1
- Shell 2
- Shell 3
- Shell 4
- Shell 5
- Terminal Boundary

N

6/7/2012

1 inch = 1 mile

1:70,000

0 1 2 mi

TRC

CH X:\WesPac\10 Hazards\mxd\Figure 10-3 Shell Pipeline Segments.mxd

Figure 10-4
Proposed Pipeline Connections
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

TRC

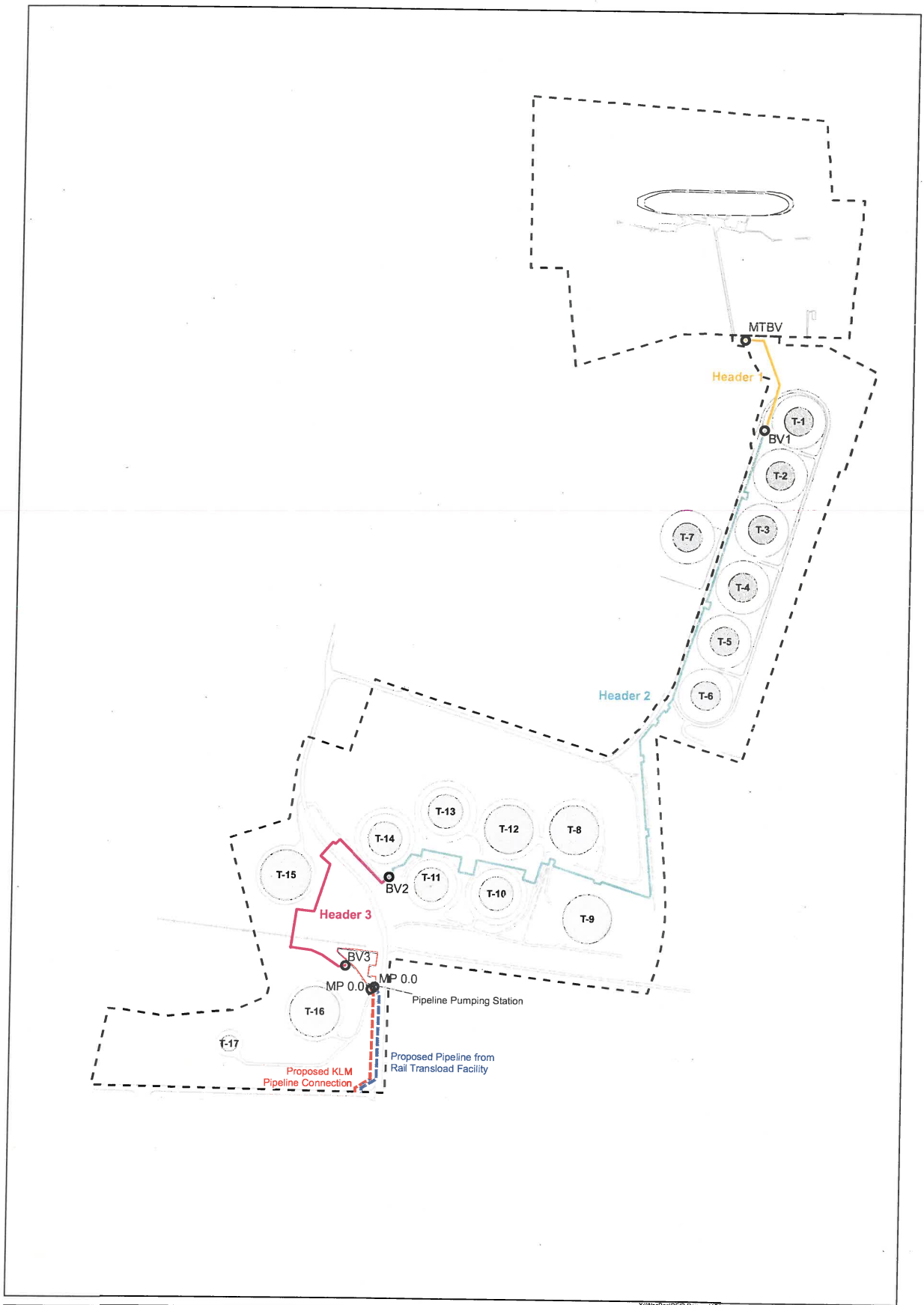
5/8/2013

- Break Valve
- Existing KLM Pipeline
- Proposed Pipeline from Rail Transload Facility
- Proposed KLM Pipeline Connection
- Terminal Boundary

1:40,000

1 inch = 3,333 feet

0 1,200 2,400 ft



X:\WesPac\DEIR Reissue\10 Hazards\mxd\Figure 10-5 Onsite Header Pipeline Segments.mxd

Figure 10-5
Onsite Header Pipeline Segments
City of Pittsburg
WesPac Pittsburg Energy Infrastructure Project

TRC

5/8/2013

- Break Valve
- Terminal Boundary
- Header 1
- Header 2
- Header 3
- Proposed Pipeline from Rail Transload Facility
- Proposed KLM Pipeline Connection

1:6,000

N

1 inch = 500 feet

0 245 490 ft

Table 10-4: Pipeline Segment Characteristics

Pipeline	Segment Name	Location[1]	Figure Reference	Year Installed	Pipe Diameter (inches)	Approximate Segment Length (feet)	Response Time[2] (minutes)	Maximum Flow Rate (cubic feet/minute)
San Pablo Bay	Shell 1	MP 0 to 7.44	Figure 10-3	1975	16	39,283	2.33	1,075
San Pablo Bay	Shell 2	MP 7.44 to 10.02	Figure 10-3	1975	16	13,622	2.33	1,075
San Pablo Bay	Shell 3	MP 10.02 to 10.54	Figure 10-3	1975	16	2,746	2.33	1,075
San Pablo Bay	Shell 4	MP 10.54 to 11.36	Figure 10-3	1975	16	4,330	2.33	1,075
San Pablo Bay	Shell 5	MP 11.3 to 13	Figure 10-3	1975	16	8,659	2.33	1,075
KLM Pipeline Connection	KLM Pipeline Connection	MP 0 to 0.72	Figure 10-4	New	12.75	32,300[3]	2.00	530
Rail Pipeline	Rail Pipeline	BV to Rail Transload Facility	Figure 10-4	New	20	2950	2.66	1,030
On-site Network	Header 1	MTBV to BV1	Figure 10-5	New	30	322	1.08	3,743
On-site Network	Header 2	BV1 to BV2	Figure 10-5	New	30	2,400	1.08	3,743
On-site Network	Header 3	BV2 to BV3	Figure 10-5	1973	20	760	1.08	1,076

[1]MP = Mile Post; MTBV = Marine Terminal Break Valve; BV = Break Valve

[2]Approximated based on manufacture specifications and engineering estimates. Estimated rupture detection time includes 45 seconds for the SCADA to detect the rupture, plus 15 seconds for the operator to respond, plus five seconds per inch of pipeline diameter for break valve closure.

[3]Includes the 0.42-mile long KLM Pipeline connection plus 5.7 miles of the existing KLM common-carrier pipeline that occurs between break valves and which could drain to the KLM Pipeline connection in the event of a rupture.

Table 10-5: Pipeline Release Volumes and Probabilities

Pipeline	Segment Name	Rupture Event			Leak Event		
		Worst-case Rupture Spill Volume (gallons)	Probability of Rupture (event/year)	Return Period* (year)	Worst-case Leak Spill Volume (gallons)	Probability of Leak (event/year)	Return Period* (year)
San Pablo Bay	Shell 1	429,100	0.00342	290	4,200	0.01369	73
San Pablo Bay	Shell 2	161,000	0.00118	850	4,200	0.00475	210
San Pablo Bay	Shell 3	47,400	0.00024	4,170	4,200	0.00096	1,040
San Pablo Bay	Shell 4	64,000	0.00038	2,630	4,200	0.00151	660
San Pablo Bay	Shell 5	109,200	0.00075	1,330	4,200	0.00302	330
KLM Pipeline Connection	KLM Pipeline Connection	232,800	0.00019	5,260	4,200	0.00077	1,300
Rail Pipeline	Rail Pipeline	49,850	0.00026	3,850	4200	0.00103	970
On-site Network	Header 1	42,200	0.00003	33,330	4,200	0.00011	9,090
On-site Network	Header 2	118,500	0.00021	4,760	4,200	0.00084	1,190
On-site Network	Header 3	21,100	0.00007	14,290	4,200	0.00027	3,700

*Return Period: Estimate of the interval of time between event occurrences.

on-site header pipelines pursuant to 40 CFR 112.20 and requirements for a Response Plan for offsite pipelines pursuant to 49 CFR 194. As described in Section 2.7.7, Environmental Commitments HM-12, HM-16 and HM-17 commit the project to complying with requirements for an FRP and Response Plan for Onshore Oil Pipelines, as well as California Pipeline Safety Act requirements for coordinating with emergency response entities. Environmental Commitment HM-18 further commits the project to participating in the Community Awareness and Emergency Response organization to facilitate emergency planning coordination. These response plans, in conjunction with the NCP and San Francisco Oil Spill Contingency Plan would ensure cleanup, making chronic exposure improbable. Since acute and chronic exposure by the public could likely be prevented in the event of a release, the primary risk of a release would be to sensitive natural environments that could be damaged by the release. Project pipeline runs in proximity to sensitive natural environments along the shoreline of Suisun Bay, and a leak or rupture could impact this area. Potential impacts to the sensitive environments are detailed in Chapter 6.0: Aquatic Resources, Chapter 7.0: Terrestrial Resources, and Chapter 17.0: Water Resources.

Pipeline Hazard Summary

As shown in Table 10-3, a leak of 4,200 gallons of oil would have a probability of occurrence ranging from once every 73 years to once every 9,090 years, depending on pipeline segment. The onsite header pipelines are inside secondary containment making a substantial offsite release from the headers improbable. The primary risk would be to sensitive natural environments that could be affected by a release from an offsite pipeline segment. Pipeline segments run in proximity to sensitive natural environments along the shoreline of Suisun Bay and a leak of this magnitude could impact sensitive environments; however, the extent of impacted area would be limited due to the relatively small size and rate of the release, the Response Plan pursuant to 49 CFR 194, as well as regional contingency planning which would ensure rapid response.. While the most probable recurrence interval of once in 73 years for a pipeline leak reflects a moderately high probability of occurrence at some point over the life of the project, no unhealthful exposure to persons or significant long-term impacts to the environment would be expected. If a leak was discovered it is expected that the area could be secured until it is cleaned up to prevent acute exposure by the public, and the Response Plan would ensure prompt response and cleanup to prevent long-term impacts or exposure. Because of the probable limited severity of impacts from a pipeline leak and the low frequency of likely occurrence, the potential public hazard associated with a potential pipeline leak would be less than significant. Potential impacts to water and ground water and biological resources are detailed in Chapter 6.0: Aquatic Resources, Chapter 7.0: Terrestrial Resources, and Chapter 17.0: Water Resources. As identified in those chapters, a pipeline leak could have significant and unavoidable adverse impacts on sensitive natural resources. Mitigation Measures HM-3, HM-4 and HM-5 would provide the City assurance beyond existing regulations that applicable operations,

monitoring, and maintenance standards are implemented as required for project pipelines to minimize the risk of a leak occurring.

As shown in Table 10-5, a pipeline rupture could discharge large quantities of oil, ranging from 21,000 gallons to more than 400,000 gallons, depending on the pipeline segment. The expected recurrence intervals for such events range from once in 290 years to once in more than 33,000 years. The longest segment has the highest statistical probability of a worst-case release: The San Pablo Bay Pipeline Segment No. 1 with a 290-year recurrence interval for a worst-case release of 429,100 gallons. The primary risk would be to sensitive natural environments that could be affected by the release. The onsite header pipelines are inside secondary containment making a substantial offsite release to sensitive resources from the headers improbable. The San Pablo Bay Pipeline runs in proximity to sensitive natural environments along the shoreline of Suisun Bay, and if a rupture of this magnitude were to occur, it could reasonably be expected to potentially reach and impact sensitive natural environments. Serious short-term environmental impacts to sensitive natural environments could be expected in the event of a pipeline rupture at a location outside of secondary containment. Potential impacts to water, ground water and biological resources are detailed in Chapter 6.0: Aquatic Resources, Chapter 7.0: Terrestrial Resources, and Chapter 17.0: Water Resources.

The Response Plan required pursuant to 49 CFR 194, in conjunction with the NCP and San Francisco Oil Spill Contingency Plan, would ensure rapid response to contain the spill with ready resources for cleanup. The highest pipeline segment release probability is 1 in 290 years, which is considered unlikely to occur during the life of the project; therefore, the risk of a major release from a pipeline rupture is very low. While a major release could have serious short-term impacts to nearby sensitive environmental resources, the readily available response resources for a worst-case discharge pursuant to FRP requirements, Response Plan requirements, the NCP, and the San Francisco Oil Spill Contingency Plan is adequate to minimize short term impacts and to minimize or eliminate long-term impacts. A release from a project pipeline would not pose a significant threat to human health since it is expected that public exposure to unsafe levels of hazardous constituents could be prevented by temporarily controlling access to the spill area until cleanup is complete. Considering the low probability of occurrence, limits to consequences, commitment for the implementation of a project specific FRP, implementation of Response Plan preparedness measures, and low likelihood of unsafe exposure levels to human receptors, the hazard to the public presented by a potential major pipeline release is less than significant. Potential impacts to water, ground water and biological resources are detailed in Chapter 6.0: Aquatic Resources, Chapter 7.0: Terrestrial Resources, and Chapter 17.0: Water Resources. As identified in those sections, a pipeline rupture could have significant adverse impacts to sensitive resources. This would be an unavoidable hazard of the project. Mitigation Measures HM-3, HM-4 and HM-5 would provide the City assurance beyond existing regulations that applicable

operations, monitoring and maintenance standards are implemented as required for project pipelines to minimize the risk of a rupture occurring.

Rail Transload Facility

The Rail Transload Facility would be designed for the arrival, transloading, and departure of up to one 104-car crude oil unit train per day, although operational plans anticipate no more than five unit trains per week. Oil collection pipes with terminal connections to receive the oil would be provided along the rails. Once the cars are in place, a flexible hose from each terminal connection would be connected to the bottom of each tank car. Oil collection pipes would be connected to a suction pipe that would vacuum the oil out of the tank cars to a crude oil transfer pump vault, from which it would be pumped to the South Tank Farm via the Rail Pipeline. Collection and suction pipes would be located within trenches that would provide secondary containment in the event of a release from the pipes.

Oil transloading at the Rail Transload Facility has the potential to result in accidental oil releases. The probability of an oil release at the Rail Transload Facility is higher than at the bulk storage facilities and pipelines due to the reliance on a high number of temporary connections (up to 104 hose connections per trainload) that would occur over the life of the facility. Due to the high number of temporary connections, the probability of a release due to human error or equipment failure (e.g., failed hose or coupling) incidents during the life of the facility is considered to be high. While the probability of an oil release occurring at the Rail Transload Facility is high, the potential magnitude of a release is much lower than for the project bulk storage facilities, due to the limited capacity of a rail car (approximately 30,000 gallons). The analysis is based on the release of the full contents of a rail car. The Rail Transload Facility is surrounded by development so there are no sensitive natural resources in adjacent areas. The residences closest to the Rail Transload Facility are located more than 150 feet from the closest Rail Transload Facility track.

The conservative upset scenario adopted as part of this evaluation involves a release of the entire contents of a single rail car. Since rail cars are independent, decoupled, and situated within a common drainage containment, the release of a single car represents a reasonable maximum upset scenario, and corresponds to the analysis required for aboveground storage tanks by Oil Pollution Prevention regulations contained in 40 CFR Part 112. The most likely type of release for the Rail Transload Facility would be located at one of the flexible hose couplings or within one of the flexible hoses that would be used to connect each tank car to the Rail Transload Facility header pipe terminal connections. The Rail Transload Facility would be constructed with a concrete base to provide drainage containment for the full crude oil unit train without movement during unloading. The concrete base would be sloped to contain potential leakage or a potential release from the rail cars, hoses and terminal connections. The spill containment system is designed to be capable of holding up to 100,000 gallons which

substantially exceeds the 30,000 gallon volume of a rail tank car. With the project secondary containment design, a release from secondary containment is unlikely. The secondary containment system is designed so that released oil would be captured in a tank from which the oil would be recovered. The surface area of the spill would be relatively small due to the ultimate capture of the spill within a tank, so volatilization would be limited. In addition, a spill would be approximately 150 feet or more from the closest residences. Considering this distance and the limited surface area for volatilization, it is not expected that vapors would reach unsafe levels at an adjacent residential area outside of the railroad rights-of-way. With the release contained onsite and vapors remaining below levels that would be unsafe offsite, there would not be unsafe levels of exposure to the public or the environment. Handling of the released oil onsite by workers would occur in compliance with OSHA regulations for worker safety. No lasting health or environmental impacts are anticipated; therefore, the hazard of a release during rail car unloading would be less than significant.

Rail Haul

Crude oil would arrive at the Rail Transload Facility via the existing BNSF Railway Company (BNSF) mainline tracks arriving through Stockton. The Rail Transload Facility is anticipated to receive up to one train per day, five days per week (260 trains per year). Crude oil transport to the Rail Transload Facility has the potential to result in accidental oil releases. The most common type of rail transport accident resulting in releases of hazardous materials is derailment. In a derailment, one or more rail cars can leave the tracks and sustain damage resulting in a release.

The Federal Railroad Administration (FRA) maintains records of rail accidents that provide data to evaluate the probability of a release of crude oil during rail transport. Train accidents are required to be reported to the FRA pursuant to regulations at 49 CFR Part 225, so that FRA has accurate information for enforcement and to improve safety. To evaluate the risk of a release of crude oil during transit, the FRA database was reviewed and the safety statistics for BNSF were evaluated for the ten year period ending December 31, 2012 (DOT, 2013). Table 10-6 provides key data from the FRA database summarizing BNSF railway safety statistics and shows that BNSF had a train accident rate ranging between 2 and 3.6 accidents per million train miles, with a consistent trend of accident reduction over this period. The average accident rate for the 10-year period evaluated is three accidents per million miles. Considering the proposed maximum number of trains per year (260 trains), the project would result in 3,640 train miles in Contra Costa County (260 shipments multiplied by 15 miles per shipment equals 3,900 miles). The probability of a train slated to transport crude oil to the project site having an accident in Contra Costa County during any given year of project operations would be 1.0×10^{-2} (3,900 miles multiplied by three accidents per 1,000,000 miles equals 0.01). This means that a train accident of some type could be expected to occur approximately once for every hypothetical 100 years of operation. Reportable accidents include: any derailment; any

Table 10-6: 10-Year Safety Record for BNSF Trains

Description	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
BNSF total train miles (x 1000)	173,448	186,459	193,487	200,210	189,953	186,016	156,729	168,930	175,577	189,847
BNSF train accidents per million miles	3.4	3.6	3.5	3.3	3.3	3.2	2.6	2.6	2.7	2
BNSF accidents	583	672	677	658	629	602	411	444	472	379
BNSF hazmat releases	4	10	10	7	10	6	7	7	5	5
Percent of BNSF accidents with hazmat releases	0.69	1.49	1.48	1.06	1.59	1.00	1.70	1.58	1.06	1.32
Cars carrying hazmat	2,599	2,958	2,762	3,565	2,927	3,238	2,880	2,513	2,502	1,888
Cars releasing	6	17	17	10	11	15	10	8	7	16
Percent of hazmat cars releases	0.23	0.57	0.62	0.28	0.38	0.46	0.35	0.32	0.28	0.85

Source: Federal Railroad Administration, 2013

collision, obstruction accident, or other impact; fire or violent rupture; act of God; any accident requiring evacuation; or other accident with material damage to railroad equipment.

Federal guidance for reporting train accidents do not specify a minimum quantity threshold for reporting a hazardous materials release. Hence, even very small releases must be reported (DOT, 2011); and are, therefore, included in the FRA database. Because the FRA statistics include all types of reportable accidents and not just those with substantial releases of hazardous materials, the probability of a substantial release of hazardous materials from a train bound for the Rail Transload Facility is much lower than the 1.0×10^{-2} overall train accident probability. Table 10-6 shows that of the average of 552 total BNSF train accidents per year over the 10-year period, approximately 1.3 percent resulted in hazardous material releases of some unknown quantity. The probability of an accident resulting in a substantial release of hazardous materials is much lower than the 1×10^{-2} probability of a train accident for a given year of the project. While the low probability suggests a train accident resulting in a release of crude oil would have a low likelihood of occurring, a train accident and resulting hazardous materials release is considered a reasonably foreseeable upset condition for analysis under CEQA. To provide a conservative evaluation, it is assumed herein that up to the entire 30,000-gallon contents of a tank car could release under an accident scenario.

A release of crude oil from a train accident could occur where the tracks are proximal to residences, other developed areas, agricultural lands, sensitive resources such as water or sensitive wildlife, or sensitive land uses such as schools. In the event of a train accident resulting in a crude oil release, released material would impact soil, and could impact shallow groundwater or surface water. As described in Impact HM-3, crude oil generally is only acutely toxic to humans under extreme exposure scenarios (e.g., injection, ingestion, or aspiration) or if hydrogen sulfide is present in a confined space or other non-ventilated atmosphere. If a crude oil release from a train accident were to occur, it is expected that emergency responders would establish exclusion areas to prevent substantial public exposure to released oil or resulting volatile emissions. However, significant impacts could occur to sensitive natural resources if such resources occur in proximity to the accident or if surface drainages are present that allow the released crude oil to migrate away from the accident location. Emergency response measures would include containment and cleanup of the spilled crude oil and would be expected to eliminate the potential for long-term impacts. The hazard of a crude oil release from a train accident with the potential for significant impacts to sensitive resources would be a significant and unavoidable impact of the project. Potential impacts to the sensitive environments are detailed in Chapter 6.0: Aquatic Resources, Chapter 7.0: Terrestrial Resources, and Chapter 17.0: Water Resources.

Mitigation Measure HM-1: Operations bulk storage tank regulations and standards auditing plan. The applicant shall not receive petroleum products in project bulk storage tanks prior to acceptance of the bulk storage tank auditing plan by the City Engineering Department. The auditing plan shall include: (1) a tabulation of the safety-related regulations and standards applicable to ongoing operation and maintenance of the project facilities; (2) procedures and schedule for periodic update of the list of applicable safety-related regulations and standards for the life of the project; (3) a self-auditing plan to be implemented by the applicant to self-monitor compliance with regulations and standards, including performance of required tasks, recordkeeping and training; and (4) a schedule for periodic independent audits by a qualified independent party acceptable to the City Engineering Department to be commissioned by the applicant. Third party audits shall occur at least biennially and a written report of findings shall be provided to the City Engineering Department.

Mitigation Measure HM-2: API Standard 653 inspection report documenting inspection and recommendations for repair, alteration and reconstruction of petroleum storage tanks. The applicant shall not receive petroleum products in project bulk storage tanks prior to acceptance of the API 653 inspection report and tank retrofitting as-built report by the City Engineering Department. The City Engineer may require reconstruction or removal from the project scope of any tank proposed for retrofitting if applicable engineering and safety standards cannot otherwise be met.

Mitigation Measure HM-3: Construction QA/QC plans. The applicant shall not construct, repair or retrofit project bulk storage tanks or pipelines prior to acceptance of QA/QC plans by the City Engineering Department. Following construction and prior to placing the facilities in operation, the applicant shall not receive petroleum products in bulk storage tanks or pipeline until as-built reports and QA/QC records have been accepted by the City Engineering Department.

Mitigation Measure HM-4: Stakeholder communication plan. The applicant shall not receive petroleum products in project pipelines or storage tanks prior to acceptance of the stakeholder communication plan by the City Engineering Department. The stakeholder communication plan shall be designed to communicate petroleum storage, pipeline and Rail Transload Facility risks and the operator's management of such risks, including planning for rapid implementation of the CWS and dissemination of information to facilitate appropriate response to the CWS in the event of any incident that poses an immediate threat to the public or the environment, including emergency warning system operation and appropriate public response.

Mitigation Measure HM-5: Operations pipeline regulations and standards auditing plan. The applicant shall not receive petroleum products in project pipelines prior to acceptance of the pipeline auditing plan by the City Engineering Department. The auditing plans shall include: (1) identification of the safety-related regulations and standards applicable to ongoing operation and maintenance of the project pipelines; (2) procedures and schedule for periodic update of the list of regulations and standards for the life of the project; (3) a self-auditing plan to be implemented by the Applicant to self- monitor compliance with regulations and standards, including performance of required tasks, recordkeeping and training; and (4) a schedule for periodic independent audits by a qualified independent party acceptable to the City Engineering Department to be commissioned by the Applicant. Third party audits shall occur at least biennially and a written report of findings shall be provided to the City Engineering Department.

Impact HM-5: Create a hazard to the public or environment through reasonably foreseeable upset or accident conditions involving the release of crude oil creating an indirect hazard due to crude oil flammability. (Significant and unavoidable.) Indirect hazards are those hazards that result from interaction of the released substance and another outside environmental factor such as a second chemical compound (reactivity) or an ignition source (flammability). While no reasonably foreseeable scenario has been identified that would result in a release from the project contacting incompatible materials, the products that would be handled by the project are flammable and can cause fires if associated vapors are within the flammable concentration range and exposed to a sufficient ignition source. Indirect hazards, by their nature have a lower probability of occurrence than direct hazards because they require at least two low probability conditions to occur simultaneously and combine in order for the secondary hazard to be created.

In the event of a release and formation of an oil pool, the more volatile components would evaporate from the pool's surface, forming denser-than-air vapors that could remain close to the ground or mix in the air and disperse at a rate dependent on the liquid pool area, temperature, and meteorological conditions. Ignition of such vapors would only occur if the concentration in the air exceeded the lower flammability limit and an adequate ignition source was present. If the vapors were to ignite, a pool fire could occur, defined as "a buoyant diffusion flame established over a horizontal fuel surface that results from the ignition of the flammable vapors evaporated from a flammable liquid pool" (CDE, 2007; NIST *et al.*, 1995). Oil products that would be handled by the project contain relatively low concentrations of volatile constituents compared to gasoline and most other refined fuels or natural gas. Therefore, it is much less likely to produce vapors in the explosive range at a potential source of ignition. Nevertheless, the result of ignition of vapors in a pool is assumed to be a pool fire. A pool fire would continue until all the liquid in the pool was consumed, or the

fire was extinguished by intervention (CDE, 2007). Of the products that would be handled by the project, crude oil is the most flammable.

A pool fire would emit thermal radiation (heat) in all directions. The average thermal radiation that would be emitted from an oil pool fire is dependent on size of the pool fire. Exposure to high levels of thermal radiation can cause serious injury or loss of life. In the event of a substantial fire at one of the project tank farms or pipelines, significant harm could occur if persons are present in harm's way and cannot withdraw from the hazard area in a timely manner. The following paragraphs describe the probability of a substantial fire event at the project tanks, pipelines, and Rail Transload Facility and the potential for significant public exposure.

Tanks

As described in Impact HM-4, a major release with fire at a project tank farm is not considered a reasonably foreseeable upset condition for CEQA analysis because the anticipated probability is so low. The worst-case reasonably foreseeable fire scenario for a release from a project crude oil storage tank would be a minor release with fire. As described in Impact HM-4, this upset scenario has an estimated probability of occurrence of 1 in 690 for any given year of the project life. Because 690 years is a very long time compared to the life of project facilities, this event is unlikely during the life of the project. Nevertheless, in an effort to minimize fire risks, the project includes provision of a new fire-protection system, and all tanks would be equipped with fixed foam systems used to extinguish oil fires, as discussed in Chapter 2.0: Proposed Project and Alternatives. A minor release and fire would be well within the capabilities of secondary containment and fire protection systems, so it would be unlikely to burn for an extended period of time.

For a pool fire, the outward heat flow near the ground level would spread over time as the size of the fire increases. Heat from a fire would not become a substantial hazard to offsite areas unless, and not until sometime after, the flames were to begin substantially exceeding the height of the secondary containment features that would otherwise obstruct the heat radiation. The closest residential area structures occur approximately 150 feet from closest storage tank secondary containment areas (refer to Figure 10-2). As a comparison, the Department of Housing and Urban Development (HUD) Acceptable Separation Distance (ASD) for the minor release and fire scenario would be approximately 40 feet for structures. The ASD for structures is the minimum separation distance HUD-funded structures must have from bulk flammable liquid storage facilities (see Appendix K: Separation Distances for Minor Release with Fire Scenarios). With the closest secondary containment area being separated by a distance of 150 feet, which is nearly four times the HUD ASD, even the worst-case minor release with fire scenario would not be an imminent threat to structures. Structures could be used to shelter from thermal radiation from the fire if needed even for worst case minor release with fire scenarios.

The closest portions of Marina Park and Pittsburg Marina occur approximately 150 and 170 feet from the closest secondary containment areas, respectively. Riverview Park is approximately 300 feet from the closet secondary containment area, and two schools and an extended care facility occur approximately 380 feet from the closest secondary containment areas. For a minor release with fire scenario, each of these separation distances, except that for Marina Park, exceed the HUD ASD for people. The ASD for people is the minimum distance that HUD-funded public gathering open-air spaces (e.g., parks, playgrounds) must have from bulk flammable liquid storage facilities. For a worst-case minor release with fire scenario, with fire occurring at the closest part of secondary containment, separation distances between fire and the closest portions of Marina Park, Pittsburg Marina, Riverview Park, or residential area could be less than the HUD ASD for people. The two nearby schools and the extended care facility are located far enough away that their separation equals or exceeds HUD ASD for people. The HUD ASD for people is based on a thermal radiation flux of 1.4 kilowatts per square meter (KW/m^2) at the receptor location, which is about 40 percent stronger than directly overhead sunshine on a cloudless day. This level of thermal flux can cause discomforting heat and redness of the skin similar to a sunburn but low enough such that people can readily shelter or egress to safety if uncomfortable levels of heat are experienced. If the minor spill with fire scenario were ever to burn without being promptly extinguished, the thermal radiation flux near the ground level would spread over time as the size of the fire increases. The distance from the fire at which the 1.4 KW/m^2 HUD thermal radiation flux standard for people would be reached would spread outward until reaching the ASD. Closer than the ASD, thermal radiation flux could reach levels that could cause serious injury or loss of life if the area is not evacuated nor shelter taken.

The storage terminal facility would be equipped with automated process and alarm systems monitored by the control room operator. Anomalous operating pressures, flows or tank levels would alarm at the control room. The control room operator is the initial responder that would assess the incident and make appropriate notifications. Any incident that posed a potential for a substantial release of crude oil or a crude oil fire would be immediately reported to 911 pursuant to CCR Title 19 Section 2703 requirements. The CCCFPD and CCCSD would be notified immediately via the call to 911 and CCCSD would be responsible for implementing the Contra Costa County's CWS if needed to alert the public or to evacuate adjacent areas in the event of an incident that is an imminent threat. Flame detectors, as described in Chapter 2.0: Proposed Project and Alternatives, Section 2.5.2.1, would be installed in strategic locations within secondary containment areas for early detection in the event of a fire. The flame detectors would be monitored at a control panel capable of automatically annunciating the fire alarm signal for operators to notify the CCCFPD via 911 and begin fire suppression activities. Storage tank fire protection systems would be designed consistent with the latest edition of NFPA and CCCFPD regulations. The CCCFPD's hazardous materials response program has a strong response presence among industries in the area. Project operations involving the handling

of bulk crude oil and partially refined products would not introduce the need for response capabilities outside of those currently in place since similar hazards are posed by a number of facilities (e.g., refineries, pipelines, chemical plants) in Contra Costa County. The CCCFPD's existing emergency-response capabilities are adequate to effectively mitigate a worst-case fire scenario at the project's tank farms (Andrews, 2011). Existing regulations for response preparedness ensure that necessary project staff are trained in their emergency response roles, and that lines of communication are in place for emergency use if needed. Emergency procedures, including contact information, response preparedness measures and responsibilities for responding to spills or fires are required be included in the Hazardous Materials Business Plan (19 CCR 2731), SPCC Plan (49 CFR 112.7) and Facility Response Plan (40 CFR 112.20). With project incident response preparedness and fire protection systems, it is expected that under reasonably foreseeable conditions a minor release with fire would be fully within the secondary containment and even for a worst case scenario would be accompanied by reasonable warning of imminent danger to persons in offsite proximal areas such that evacuation or sheltering could occur without serious injury. Nevertheless, because harmful levels of thermal radiation flux could occur outdoors at closest residential areas and public gathering locations, the hypothetical minor release with fire would present a significant thermal exposure hazard if it were to occur. This risk would be significant and unavoidable. Mitigation Measures HM-1, HM-2 and HM-3 would help to minimize the risk of such occurrence since storage tank accident studies have concluded that most accidents can be avoided if applicable requirements and standards are adhered to (Cornell and Baker, 2002, Chang and Lin, 2006). These mitigation measures would provide the City direct assurance beyond existing regulations that critical design and operations standards for prevention of upset conditions are implemented as required.

Pipelines

To assess the potential impact of a fire resulting from a pipeline release, the reasonably foreseeable worst-case scenario assumes that a release occurs, creating a pool of oil at the surface, and that an ignition source and flammable vapors in an adequate concentration to catch fire are present. The CDE Protocol approximates the probability of a crude oil pipeline rupture and pool fire to be 0.0000125 events per mile-year and a crude oil pipeline leak and pool fire to be 0.000149 events per mile-year. Due to the larger magnitude of release, a crude oil pipeline rupture and pool fire in a developed area could be a significant threat to human health and property, or in an undeveloped area, to the natural environment.

If a crude oil release from a project pipeline were to catch fire, it could present a serious hazard to public safety and the environment through thermal radiation. Specific impacts would be dependent on the location and size of the pool fire, and significant harm to persons and sensitive environments could occur. In addition, toxic combustion byproducts such as naphthalene, polycyclic aromatic hydrocarbons, sulfur dioxide, carbon dioxide, carbon monoxide, nitrogen oxides,

and volatile organic compounds could be formed and released into the air from a fire, along with particulates such as metals and soot. Under most atmospheric conditions, most emissions would be carried upward with the thermal plume resulting in low concentrations at ground level. The project pipeline routes are primarily through open space areas, limiting the potential for significant thermal exposure to persons.

Pursuant to the California Pipeline Safety Act, prior to operations, the project would be required to provide each fire department with fire suppression responsibilities, a map showing the locations of each pipeline, a description of all products being transported within the pipeline, and a contingency plan for pipeline emergencies for use by the SFM in the event of an emergency. As previously described, the project is committed to the installation of a CWS to alert the public in the event of an imminent hazard to public health (as described above under Impact HM-3 and in Environmental Commitment HM-11, see Chapter 2.0: Proposed Project and Alternatives, Section 2.7.7.)

Approximately 6,000 total feet of the San Pablo Bay Pipeline is located in proximity to commercial or residential development, with the closest commercial or residential development located approximately 200 feet away. The proposed KLM Pipeline connection and the Rail Pipeline would be located in developed areas approximately 100 feet from residential developments. With a 100-foot minimum distance between a hypothetical fire and residential structures, the fire would not be an imminent threat to the structural integrity of residences (NIST, 2000). Structures could be used to shelter from thermal radiation from the fire if needed.

For a pool fire, the heat would spread outward and increase in intensity as the size of the fire increases. In the unlikely event of a large pool fire, the heat radiation could build up to a level that would be hazardous to people in areas proximal to the fire. With project incident response preparedness and fire protection systems, it is expected any spread of fire would be accompanied by reasonable warning of imminent danger such that evacuation could occur if needed without serious injury. Considering the approximately 11,000 total feet (2.1 miles) of project pipeline that would occur in proximity to commercial or residential development, the probability of a crude oil rupture and fire would be 2.6×10^{-5} per project-year (1.25×10^{-5} events per mile-year multiplied by 2.1 miles). This is equal to a probability of occurrence of 1 in 38,000 for any given year of the project life. Because 38,000 years is orders of magnitude longer in time than the project, the pipeline release with pool fire in proximity to commercial or residential areas where it could present an imminent heat radiation threat to the public is very unlikely to occur and not a reasonably foreseeable upset condition for CEQA analysis. The probability of a fire associated with a pipeline leak in proximity to commercial or residential areas would be an order of magnitude higher at approximately 1 in 3,200 for any given year of the project life (1.49×10^{-4} events

per mile-year multiplied by 2.1 miles), which also is not a reasonably foreseeable upset condition.

A pipeline release or leak and pool fire at any project pipeline location outside of secondary containment could impact sensitive environmental resources, including nearby water resources and sensitive ecological environments. Therefore, in the event of a pool fire from a pipeline release or leak, serious impacts to sensitive environments are possible. Approximately 14.4 miles of project pipeline occur outside of secondary containment areas, including the existing KLM common-carrier pipeline, an approximately 0.42 mile segment of the proposed KLM Pipeline connection (two pipes) and an approximately 0.56 mile portion of the proposed Rail Pipeline. Considering the pipeline rupture and pool fire probability of 1.25×10^{-5} events per mile-year and the pipeline leak and pool fire probability of 1.49×10^{-4} events per mile-year, the probabilities of these two scenarios occurring outside of secondary containment are 0.00018 and 0.00214, respectively. These values indicate that the expected frequency of these events would be approximately 1 in 5,000 for a rupture and pool fire outside of secondary containment for any given year of the project and 1 in 500 for a leak and pool fire for any given year of the project. Because 5,000 years is orders of magnitude longer in time than the project, the pipeline rupture and fire outside of secondary containment scenario is not a reasonably foreseeable upset condition for CEQA analysis. The probability of pipeline leak and fire outside of secondary containment is an order of magnitude higher, but still unlikely. Potential risks to sensitive environments are detailed in Chapter 6.0: Aquatic Resources, Chapter 7.0: Terrestrial Resources, and Chapter 17.0: Water Resources.

Rail Transload Facility

As described in Impact HM-4, the maximum reasonably foreseeable release from Rail Transload Facility operations is 30,000 gallons (the volume of one tank car). The spill containment system is designed to be capable of holding up to 100,000 gallons so that both an oil release and firefighting water can be contained if a fire and release occur simultaneously. Because the containment slab encompasses the entire transloading area, a release and fire is anticipated to be contained within the containment slab. The amount of oil that could be involved in a pool fire would be small because the containment slab would be designed to convey a potential release to a tank so the surface area of the oil pool available to burn would be limited.

The Rail Transload Facility is surrounded by development so there are no sensitive natural resources in adjacent areas. The residences closest to the Rail Transload Facility are located more than 150 feet from the closest Rail Transload Facility track. With a 150-foot minimum distance between a hypothetical fire and residential structures, the fire would not be an imminent threat to the structural integrity of residences (NIST, 2000), so structures could be used to shelter from thermal radiation from the fire, if needed.

For a pool fire, the heat would spread outward and increase in intensity as the size of the fire increases. With project incident response preparedness and fire protection systems, it is expected that any spread of fire would be accompanied by reasonable warning of imminent danger such that evacuation could occur if needed without serious injury. Handling of the released oil onsite by workers would occur in compliance with OSHA regulations for worker safety. No lasting health or environmental impacts would be expected. With no lasting health or environmental impacts, the hazard of a release and fire during rail car unloading would be less than significant.

Rail Haul

As described in Impact HM-4, for analysis of reasonably foreseeable upset conditions pursuant to CEQA, a conservative approach has been utilized assuming up to the full 30,000-gallon content of a tank car could be released under a train accident scenario. If an ignition source and flammable vapors, in an adequate concentration to catch fire were present, a pool fire could result. If a crude oil release from a train accident were to catch fire, it could present a serious hazard to public safety and the environment through thermal radiation. Specific impacts would be dependent on the location and size of the pool fire. In addition, toxic combustion byproducts such as naphthalene, polycyclic aromatic hydrocarbons, sulfur dioxide, carbon dioxide, carbon monoxide, nitrogen oxides, and volatile organic compounds could be formed and released into the air from a fire, along with particulates such as metals and soot. Under most atmospheric conditions, most emissions would be carried upward with the thermal plume resulting in low concentrations at ground level.

For a pool fire, the heat would spread outward and increase in intensity as the size of the fire increases. In the unlikely event of a large pool fire, the heat radiation could build up to a level that would be hazardous to people in areas proximal to the fire. Because fire would be a secondary impact of the hypothetical train accident, it is expected any spread of fire would be accompanied by reasonable warning of imminent danger such that evacuation could occur if needed without serious secondary fire related injury.

As described in Impact HM-4, the probability of a release from a train accident is lower than 1 in 100 during any given year of operation at the maximum anticipated crude oil shipping rate. The probability of a related fire would be even less since fire would be a secondary impact. While a release of project crude oil and resulting fire from a rail accident is unlikely to occur from the project, the hazard is considered to be a significant and unavoidable impact of the project.

Mitigation Measure HM-1 through HM-5 would reduce the potential for an upset event that could lead to a release and fire from the project tanks, pipelines and Rail Transload Facility to the maximum extent practical. No further mitigation is required.

Mitigation Measure: No additional mitigation measures available.

Impact HM-6: Emissions of hazardous substances and handling of hazardous materials within 0.25 mile of existing or proposed schools. (Less than significant.) Two schools, St. Peter Martyr School and First Baptist Head Start, are located within 0.25 mile of the proposed storage terminal (refer to Figure 10-2) and one additional school, Parkside Elementary School, is located within 0.25 mile of the proposed KLM Pipeline connection, Rail Pipeline, and Rail Transload Facility. Project-related hazardous emissions are not anticipated to increase health risk levels above the CEQA thresholds at any school. Impact AQ-3, discussed in Chapter 4.0: Air Quality, details the project-related maximum health risk increases for cancer, chronic and acute non-cancer hazard index, and particulate matter.

Crude oil and other petroleum products that would be handled by the project are considered hazardous materials. The project cannot achieve its objectives without the handling of crude oil within 0.25 mile of schools, since the schools currently exist within 0.25 mile of the existing facilities that would be used for the project. No significant impact to schools is anticipated under normal operating conditions. Reasonably foreseeable upset condition scenarios are described and analyzed in Impacts HM-4 and HM-5.

Mitigation Measure: No mitigation required.

Impact HM-7: Risk to the public or the environment as a result of being located on a site that is included on the Cortese List. (Less than significant.) As discussed in Section 10.1.2.1, the San Pablo Bay Pipeline is buried, in part, on three properties listed on the Cortese List (refer to Figure 10-1). To assess the project impact, the characteristics of these three sites were reviewed and the proposed project activities on these sites were considered to determine whether the occurrence of the project facilities on these sites could create a significant hazard to the public or the environment, as further described in the following paragraphs.

Information on soil conditions at the three Cortese List sites was reviewed to determine if corrosive soils exist that could negatively impact the structural integrity of a pipeline. Available data shows that the three sites are impacted by metals, and no corrosive soils, naturally occurring or anthropogenic, are known to exist in these areas. Soil types are described in Chapter 9.0: Geology, Soils, and Seismicity.

The San Pablo Bay Pipeline is an existing facility. Subsurface work along this existing pipeline is not anticipated to be required, except possibly if pipeline reactivation or operations inspections indicate that one or more locations along the pipeline require excavation for inspection or repair. If subsurface work is required at any location within the Cortese List sites, the employer would be required to thoroughly survey site conditions to determine, so far as practicable, the predictable hazards to employees and the kind and extent of safeguards necessary to execute the work in a safe manner (8 CCR 1511). In situations where employees are subjected to a known job-site hazards (e.g., flammable liquids and gases, toxic materials, confined spaces) they would be instructed in the recognition of the hazard, procedures for protecting themselves from injury, and first aid procedures in the event of an injury (8 CCR 1510). The safeguard measures required by these existing regulations and requirements would limit the potential for exposure of persons or the environment to hazardous materials to safe levels such that the risk to the persons and the environment would be less than significant.

Mitigation Measure: No mitigation required.

Impact HM-8: Impair implementation of or physically interfere with an adopted emergency response plan or evacuation plan. (Less than significant.) No potential conflicts were identified through the review of local emergency response and evacuation plans, including the City of Pittsburg Emergency Operation Plan, Contra Costa County Emergency Operations Plan, and Contra Costa County Hazard Mitigation Plan. Project construction or operations would not interfere with emergency routes, evacuation routes, or CCCFPD critical facilities. No shortfalls in any of these emergency plans were identified that would affect or be affected by the project.

Due to shared on-site roads and site access locations, construction activities for the proposed project could potentially impact access to facilities located adjacent to the project site. During construction, emergency access, egress, and evacuation routes outlined in NRG's Emergency Response Plan would be maintained.

Mitigation Measure: No mitigation required.

10.2.3.2 Alternative 1: Reduced Onshore Storage Capacity

Construction-related Impacts

Impact HM-9: Create a hazard to workers, the public, and/or the environment through the routine transport, use, and/or disposal of hazardous materials. (Less than significant.) Potential hazards for workers, the public, and the environment under Alternative 1 are similar to those of the proposed project. Refer to Impact HM-1.

Mitigation Measure: No mitigation required.

Impact HM-10: Create a hazard to workers, the public, and/or the environment through exposure to existing hazardous materials at the site. (Less than significant.) Potential hazards for workers, the public, and the environment under Alternative 1 are similar to those of the proposed project. Refer to Impact HM-2.

Mitigation Measure: No mitigation required.

Operational Impacts

Impact HM-11: Create a hazard to workers, the public, and/or the environment through the routine transport, use, and/or disposal of hazardous materials. (Less than significant.) Potential hazards for workers, the public, and the environment under Alternative 1 are similar to those of the proposed project. Refer to Impact HM-3.

Mitigation Measure: No mitigation required.

Impact HM-12: Create a hazard to the public or environment through reasonably foreseeable upset or accident conditions involving the release of a hazardous material to the environment. (Significant and unavoidable.) Compared to the proposed project, Alternative 1 would not include the East Tank Farm. Therefore, it would have six fewer oil storage tanks and 972,000 BBLs less storage capacity. Reducing the number of tanks, from 16 storage tanks to 10 storage tanks, would result in a proportional reduction in probability of a product release from a storage tank. The probability of a major release within secondary containment would be reduced to 1 in 1,000 per project year compared to 1 in 625 for the proposed project. The probability of a minor release with fire in secondary containment would be reduced to 1 in 1,100 per project year compared to 1 in 690 for the proposed project. However, these events could still be reasonably foreseeable upset scenarios. The tanks in the South Tank Farm are generally located farther away from residential and public areas compared to the tanks in the East Tank Farm. Three of the tanks in the South Tank Farm are located proximal to existing or proposed residential neighborhoods and/or Marina Park. Therefore, Alternative 1 would reduce the number of storage tanks in proximity to residential and park areas to three storage tanks compared to nine for the overall project. This would proportionally reduce the risks posed to the public by foreseeable storage tank upset conditions described for the proposed project in Impact HM-4. However, the same hazards would still occur and would be significant for potential upset conditions so this alternative would not eliminate any significant impact. Alternative 1 also would not substantially reduce any foreseeable upset scenario hazard. The only material benefit would be the reduction in probability of upset scenario, which would not be significantly reduced because it is already very low for the proposed project. There would be no substantial difference in probability of a pipeline release and no difference in operations at the Rail Transload Facility. Because both the East Tank Farm and

the South Tank Farm drain toward the same waters and sensitive environments, there would be no identifiable risk reduction for sensitive environments other than the proportional reduction in release probability.

Mitigation Measure HM-6: Operations bulk storage tank regulations and standards auditing plan. Refer to Mitigation Measure HM-1.

Mitigation Measure HM-7: API Standard 653 inspection report documenting inspection, and recommendations for repair, alteration and reconstruction of petroleum storage tanks. Refer to Mitigation Measure HM-2.

Mitigation Measure HM-8: Construction QA/QC plans. Refer to Mitigation Measure HM-3.

Mitigation Measure HM-9: Stakeholder communication plan. Refer to Mitigation Measure HM-4.

Mitigation Measure HM-10: Operations pipeline regulations and standards auditing plan. Refer to Mitigation Measure HM-5.

Impact HM-13: Create a hazard to the public or environment through reasonably foreseeable upset or accident conditions involving the release of crude oil creating an indirect hazard due to crude oil flammability. (Significant and unavoidable.) Compared to the proposed project, Alternative 1 would have six fewer oil storage tanks and 972,000 BBLs less storage capacity. This would proportionally reduce the probability of a product release from a storage tank and related fire, as fewer tanks would be in operation, but would not reduce the probability of a product release from a pipeline. There would be no material difference in potential impacts from either a tank or a pipeline release and fire, and no identifiable potential impact reduction for sensitive environmental areas. Alternative 1 would reduce the probability of a minor release and fire near residential and public areas and there would be no risk of a pool fire near the Pittsburg Marina or Riverview Park. Furthermore, there would be a reduced probability of a pool fire near residences because only three tanks would be located where offsite residences are nearby compared to nine tanks for the proposed project. Therefore, the probability of a pool fire near residences would be reduced to approximately one-third of that of the proposed project. However, the reduction in probability would not result in a significant risk reduction because the risk is already very low for the proposed project.

Mitigation Measure: No additional mitigation measures available.

Impact HM-14: Emissions of hazardous substances and handling of hazardous materials within 0.25 mile of existing or proposed schools. (Less than significant.) Two schools, St. Peter Martyr School and First Baptist Head Start, are located within 0.25 mile of the South Tank Farm (refer to Figure 10-2) which would remain present for either the proposed project or Alternative 1. Similar to the proposed project, hazardous emissions from Alterative 1 would not be expected to increase health risks levels above the CEQA threshold for any health risk category.

Alterative 1 would require handling of crude oil within 0.25 mile of the same schools that occur within 0.25 mile of the proposed project. No significant impact would be expected to schools under normal operating conditions. Reasonably foreseeable upset condition scenarios for Alternative 1 are described in Impacts HM-12 and HM-13.

Mitigation Measure: No mitigation required.

Impact HM-15: Risk to the public or the environment as a result of being located on a site that is included on the Cortese List. (Less than significant.) Alternative 1 would use the same pipelines as the proposed project, and there would be no difference in the potential for impacts due to the pipelines crossing sites identified on the Cortese List. Refer to Impact HM-7.

Mitigation Measure: No mitigation required.

Impact HM-16: Impair implementation of or physically interfere with an adopted emergency response plan or evacuation plan. (Less than significant.) Similar to the proposed project, Alternative 1 would not impair the implementation of or physically interfere with the local emergency response and evacuation plans. Refer to Impact HM-8. Similar to the proposed project, Alternative 1 would not result in or be affected-by any emergency response plan shortfall.

Mitigation Measure: No mitigation required.

10.2.3.3 Alternative 2: No Project

Impact HM-17: Create a hazard to workers, the public, and/or the environment through the routine transport, use, and/or disposal of hazardous materials or exposure to existing hazardous materials at the site; create reasonably foreseeable upset or accident conditions involving the release of a hazardous material to the environment; or cause emissions of hazardous substances and handling of hazardous materials within 0.25 mile of existing or proposed schools. (No impact.) Under this alternative, no new construction would occur at the project site, and there would be no project operations or related impacts due to the use, handling, or encountering of

hazardous materials. There would be no potential for upset conditions such as a crude oil release or fire associated with the project, and no risk of impacts to schools. Emissions from the existing facilities at the site would remain unchanged. There would be no potential for the project to pose a risk due to being located on a site identified on the Cortese List, or impair or interfere with an adopted emergency plan.

Mitigation Measure: No mitigation required.

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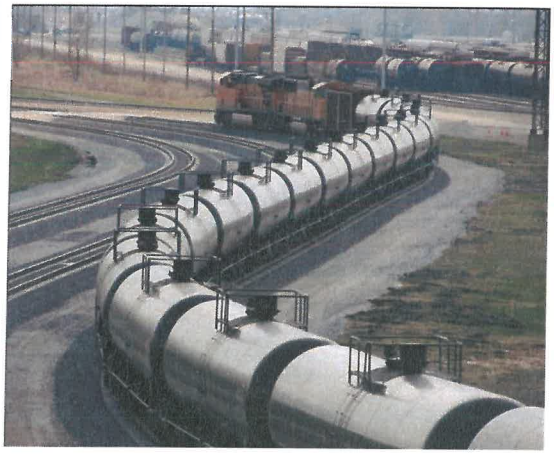
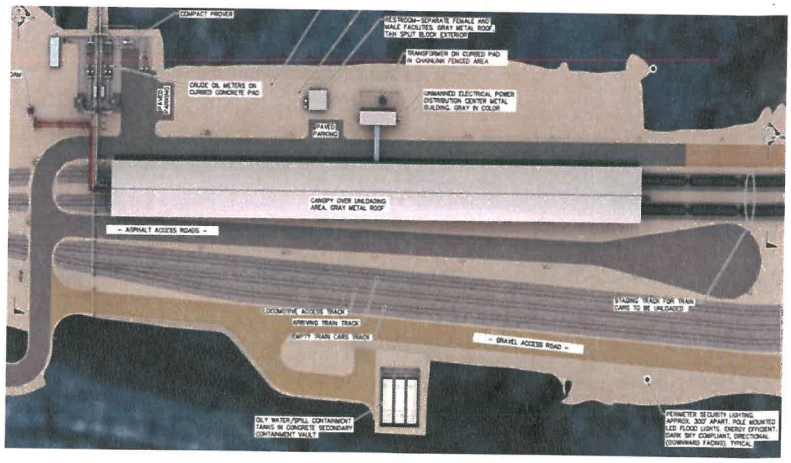
Exhibit B

EXHIBIT

Exhibit B

Phillips 66 Company Rail Spur Extension Project
Public Draft Environmental Impact Report
And
Vertical Coastal Access Project Assessment





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4.7 Hazards and Hazardous Materials

This section discusses potential public safety and hazardous materials impacts associated with the Rail Spur Project. Potential impacts include train derailments, rail crossing hazards, fires, explosions, and releases of hazardous materials from activities associated with the operation of the rail tank car unloading facilities. The information in this section outlines the environmental setting, regulatory setting, significance criteria, potential risk scenarios and their significance, and the levels of risk to the public or environment associated with these scenarios.

In addition, this section presents an analysis of the estimated frequency and volume of oil spills for the Rail Spur Project. For a discussion of health risk impacts, please see Section 4.3, Air Quality.

4.7.1 Environmental Setting

For the Rail Spur Project, environmental setting or baseline conditions reflect the baseline risks of upset associated with the existing refinery, pipeline system and rail operations. Once these baseline risks are quantified, the significance criteria can be used to determine if there is an increased level of risk associated with the project or alternative, and if the proposed change in the system introduces a significant increase in the risk of upset or an increase in the severity of an already significant impact.

In general, oil and gas refinery facilities present hazards to employees and the public due to:

- The presence of flammable and toxic gases, as well as gas processing by-products, such as flammable propane and butanes;
- The storage and transport of crude oil, natural gas, propane, butane, or other gas liquids; and
- Crude oil spills.

Not all of these hazards are present at all refinery facilities. The proposed rail facilities would expand the area where potential crude oil spills could occur, as well as the potential for fires and explosions. The impact section discusses these hazards and their potential impacts, as well as their estimated frequency of occurrence based on industry-wide experience.

4.7.1.1 Study Area and Scope

For the public safety analysis, the study area includes the rail corridors in the County associated with the Rail Spur Project, the existing facilities and pipelines, alternatives, and the areas in the immediate vicinity of the Rail Spur Project that could be affected by an upset at the unloading facilities. The area that could be impacted by a release also includes all rail routes in the County and any routes associated with existing trucking of crude oil or associated facility hazardous materials.

An upset condition at the listed facilities or along transportation routes could have an adverse impact to the public and environmental resources in the study area. Impacts to air, water, and biological resources are discussed in the appropriate sections of this Environmental Impact Report. The study area that would be affected in terms of public safety by an upset condition includes:

- Residences and businesses near the Project Site;
- Residences and businesses located along the transportation routes; and
- Any population located along the rail routes within San Luis Obispo County.

4.7.1.2 Characteristics of Crude Oil

This section discusses the properties of crude oil as it relates to safety impacts, such as oil spills, toxic exposure, and fires.

A spill of crude oil from a rail car, unloading equipment and pipelines could damage the environment if oil spilled on land, or in rivers, creeks, or the ocean, and could produce public safety concerns from fires that may arise if the oil burns. Flammable vapors (propane, butane, and pentane) may also emanate from the crude oil, and there may be safety hazards arising from toxic vapors in the crude oil (primarily benzene and hydrogen sulfide).

Crude oil, as it emerges from the wellhead, is a heterogeneous mixture of solids, liquids, and gases. This mixture includes sediments, water and water vapor, salts, and acid gases, including carbon dioxide and, sometimes, hydrogen sulfide. Flammable vapors that may emanate from crude oil include methane, propane, butane, and pentane.

Crude oil comes in a variety of forms and is characterized in several different ways. For example, oils are frequently classified by their American Petroleum Institute (API) gravity, which is a measure of how heavy or light they are compared to water. Oils with an API gravity greater than 10 will float on water, while those with an API gravity less than 10 will sink. Thin and volatile oils are "light," whereas thick and viscous ones are "heavy." Light oils have an API gravity of 30 to 40 degrees, whereas heavy oils may have an API gravity of less than 12 degrees. Some of heaviest crude oils even have API gravities that are less than 10 degrees and will therefore sink in water.

In addition to API gravity, crude oils are also characterized by Reid vapor pressure. Reid vapor pressure (ASTM Method D 323) is the absolute vapor pressure exerted by a liquid at 100 degrees Fahrenheit (°F). The higher the Reid vapor pressure, the more volatile the oil and the more readily it will evaporate.

Oils are typically mixtures of many different compounds, most of which are hydrocarbons. There are a series of main hydrocarbon groups in petroleum. Saturates are hydrocarbons with straight chains of carbon atoms, while aromatics are hydrocarbons consisting of rings of carbon. Asphaltenes are complex polycyclic hydrocarbons that contain many complicated carbon rings and nitrogen-, sulfur-, and oxygen-containing compounds.

Sulfur in crude oil occurs in many natural compounds including hydrogen sulfide (H_2S), a toxic gas that can cause injuries or fatalities if released to the atmosphere and subsequently inhaled. Total sulfur ranges from approximately one to four percent by weight in crude oils, while H_2S concentrations can reach 100 parts per million (ppm) in "sour" crudes. Fortunately, its strong, pungent odor is detectable at a level substantially below that which causes adverse health effects. However, H_2S also causes paralysis of the olfactory functions at levels below health effects. Other constituents of crude oil include nitrogen and oxygen compounds, as well as water- and metal-containing compounds, such as iron, vanadium, and nickel.

4.7.1.3 Risk Assessment Methodology

Risk assessment involves evaluating risks presented to the public by the facility in the form of hazardous materials releases resulting in explosions, flammable vapors, or toxic material impacts.

Quantitative Risk Assessment Approach
The QRA analyzes the risks of immediate human safety impacts presented by industrial operations on nearby populations. The assessment follows commonly accepted industry standards including the recommendations of the Center for Chemical Process Safety (CCPS), the Health and Safety Executive of the United Kingdom, and the County of Santa Barbara Environmental Threshold and Guidelines for Public Safety.

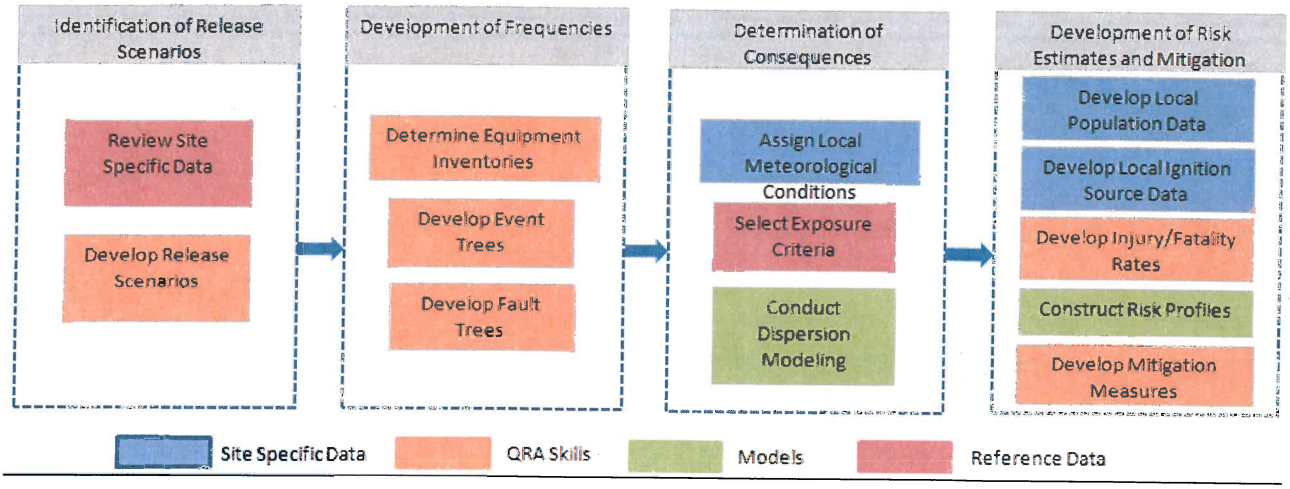
The main objective of the QRA is to assess the facility's risk of generating serious injuries or fatalities to members of the public, to assess the risks of spill events, and to develop mitigation measures that could reduce these risks. The development of the serious injury and fatality aspects of the QRA involves five major tasks:

- Identifying release scenarios;
- Developing frequencies of occurrence for each release scenario;
- Determining consequences of each release scenario;
- Developing estimates of risk, including risk profiles; and
- Developing risk-reducing mitigation measures.

Figure 4.2-1 shows the steps in developing a QRA.

A QRA computer model, developed by Marine Research Specialists, is used to calculate the risk profiles and, in conjunction with Geographic Information System software, to manage the data in accordance with CCPS guidelines for hazard assessments (CCPS 1989). The model is based on a polar coordinate grid of cells. The grid extends at least 0.5 miles from the facility in all directions and has varying cell sizes depending on the populations and ignition sources. Hazard zones are then laid over the grid to determine populations impacted. The following sections discuss information developed as inputs to the model.

Figure 4.7-1 Steps Involved in Developing a Quantitative Risk Assessment



Meteorological conditions at the site are represented by two stability classes: F stability/2 meters per second (m/s) and D stability/4 m/s. Wind conditions are divided into 16 directions and the probability of wind in each direction, at each stability class and speed, is entered.

Fatality and serious injury probabilities are entered for each type of scenario (i.e., flame jets, fires, vapor clouds, including flammable and toxic clouds, explosions, and boiling liquid expanding vapor explosions), indicating the percentage of persons who are exposed to a scenario that would suffer serious injuries or fatalities.

Population density information developed for each receptor includes the number of persons present at each location, the area over which the persons are distributed, and the maximum number of persons that could be exposed. If a cloud covers only a portion of the area, the population density is used to determine the number of persons exposed.

A use factor is applied to each receptor based on the hours per day that persons are at the location. For example, a receptor that has persons at it 12 hours per day would have a use factor of 0.5. This factor reduces the frequency of a release scenario impacting persons.

An ignition probability at each receptor is applied, which defines the probability that a flammable cloud would reach the receptor and ignite and affect the receptor location. For example, if there are no ignition sources between the receptor and the release point and there is an ignition point at the receptor, such as a campfire, which has a high probability of igniting the cloud, then the ignition probability would be 1.0 at the receptor.

This would mean that any receptor farther from the release point would not be impacted. If there are ignition sources at the release location (such as flares or heaters), the ignition probability would be less than 1.0, meaning that part of the time the flammable cloud would not reach the receptors at all. The sum of ignition probabilities along any one path is equal to or less than 1.0.

A shielding factor is also applied to receptor locations. The shield factor is applicable to thermal scenarios only, such as flame jets, fires, or boiling liquid expanding vapor explosions. Thermal scenarios only produce impacts if the receptor is directly exposed to the flame and has a "line of sight." Buildings, vegetation, terrain, and other types of obstructions would prevent persons exposed to the fire from experiencing the full effects, and would reduce the probability that the person would suffer a serious injury or fatality.

Release scenario frequencies are determined though failure rate analysis and fault trees, which detail the general conditions and equipment-specific frequencies that could lead to a release. Event trees evaluate post-release behavior of the released material, such as whether it forms a flammable cloud, flame jet, toxic cloud, explosion, or a boiling liquid expanding vapor explosion.

The end products for the serious injury and fatality analysis are "risk profile" curves, one for fatalities and one for serious injuries, developed from the scenario frequencies and effected populations for each scenario. The risk profile curves estimate the risk that any existing population would suffer fatalities or serious injuries.

In general, a conservative (estimating more risk than would actually occur) approach is taken in conducting the analysis. Using a conservative approach ensures that risks are overestimated and ensures the focus of efforts are on the areas that produce the highest risk. Conservative assumptions include the following:

- Minimal piping friction effects. Consequence analysis assumed that release volumes were located at the break source and all releases were assumed to behave like a release from a short pipe length or a hole in a vessel. Piping lengths, which would increase the friction and reduce the release rates, were not included. In addition, for flammable releases, the peak release rate was used to determine the hazard zone. This approach produces larger hazard zones since the release rate would most likely decrease over time, thereby reducing the size of the impact zone over time.
- Minimum human intervention and shutdown systems included. It was assumed there would be no human intervention in the event of a crisis situation. Manual shutdown systems were assumed to not be activated, or activated only after a sufficient amount of material was released, which would allow the hazard zones to reach their maximum extents (given the dispersion and meteorological conditions at the time of the release). All automatic shutdown systems that can isolate portions of the plant were assumed to fail, and the failure rates of these automatic shutdown systems were included in the fault tree analysis. However, it was assumed that compressor low pressure shutdown systems would prevent the system from continuing to operate and compress additional gas in the event of an equipment failure.
- Maximum release volumes were assumed. All releases were assumed to release the entire volume of the facility gas system. In reality, numerous valves and equipment designs would prevent a release of the majority of the gas inventory in the field through a given pipe or equipment rupture.

Spill Risk Analysis Approach

The approach for the spill analysis involved estimating the frequency of release events from the facilities and the release volumes. Spill volumes from a pipeline system rupture are based on the pipeline diameter and the terrain profile, which would limit the amount of oil that could drain out of the pipeline. In addition, the pumping rate also affects the size of a release since oil pumped into the pipeline would contribute to the release size until the pumps are shut down. Spill volumes from rail cars were assumed to include the complete rail car inventory, as well as multiple rail car releases for train derailment scenarios.

Spills that would be contained by the berms and drainage system valves and, for areas outside of berms, would be directed to the drainage basins (tertiary containment). A spill would only be directed outside of the field after a subsequent failure in the drainage basin discharge procedure or equipment.

Security Risk

Effective and comprehensive site security programs are a prudent aspect of reducing the risk of chemical releases at a facility. Although the Rail Spur Project area would not be considered a terrorist target compared to New York City or Washington, DC, it could be the subject of vandalism that could release hazardous materials.

The U.S. Department of Homeland Security established chemical facility anti-terrorism standards in 2007 (6 Code of Federal Regulations [CFR] Part 27). This rule established risk-based performance standards for the security of chemical facilities. It requires affected chemical facilities to prepare security vulnerability assessments that identify facility security vulnerabilities and to develop and implement site security plans, which include measures that satisfy the identified risk-based performance standards.

The security vulnerability assessments include analysis related to asset characterization, threat assessment, vulnerability analysis, risk assessment, and countermeasure assessments. Generally, facilities covered by the Occupational Safety and Health Administration (OSHA) Process Safety Management and Environmental Protection Agency Risk Management Plan rules are required to comply with these standards.

A number of industry groups, including the API, the Center for Chemical Process Safety, the Synthetic Organic Chemical Manufacturers Association, American Chemistry Council, and the Chlorine Institute have developed approaches for assessing security risk. Each of these methods involves analyzing the security systems at the facility in combination with the hazards and determining a level of security risk.

Security systems at the site include:

- Security policies for employees and contractors including access control, pre-employment screening, information security, and post-employment issues;
- Appropriate signage preventing access;
- Fencing systems;
- Visitor sign-in and sign-out;
- Surveillance of hazardous material areas;
- Employee and contractor identification methods;
- Night lighting;
- Partnerships with local response agencies;
- System to report and collect security incidents;
- Communications equipment; and
- Employee vehicles and access keys, codes, and card security.

The Applicant indicates that the site has a comprehensive security system designed to address all security issues. The security system is periodically tested to confirm its effectiveness. It must meet or exceed Industry standards while addressing Homeland Security issues.

Release Scenarios

For the existing refinery and pipelines, the approach to develop release scenarios is grouping the equipment and operations by operating parameters -- equipment with similar temperatures, pressure, and composition were grouped into one set of scenarios. This generally produced a set

of release scenarios for each process. Each set of release scenarios contains at least one rupture release and one leak release. A rupture is defined as a large process inventory release over a short period caused, for example, by catastrophic equipment failure. Ruptures are generally associated with releases through holes larger than 1 inch. A leak is defined as a process inventory released due to a small valve failure or hole in a vessel, for example, generally less than 1 inch in diameter. This approach encompasses a range of risks by including a less frequent, more severe scenario, and a more frequent, less severe scenario. In some cases, the leak release actually produces a higher risk (i.e., combination of consequence and frequency) than the associated rupture release because leaks occur more frequently than ruptures.

The principal immediate hazards to public health at an oil refinery include:

- Releases of flammable gas causing vapor cloud explosions or thermal impacts from fire and flame jets;
- Releases of flammable gas causing vapor cloud explosions, thermal impacts from fire and flame jets, or thermal and overpressure impacts from explosions and boiling liquid expanding vapor explosions;
- Releases of odorant causing toxic impacts; and
- Releases of crude oil with subsequent fire causing impacts from thermal exposure to crude oil fires.

Failure Frequencies

Once the scenarios have been identified, the analysis attempts to estimate the frequency of each scenario. This is done by combining the series of events necessary for the scenario to be realized. These are called "fault trees." For example, a release from a simple pipe and valve system could be due to the pipe breaking or leaking, the valve breaking or leaking, or an operator leaving a valve open during a maintenance procedure. Any of these events would cause a release of the material. Failure rate databases quantify how often each of these events occurs.

Several failure rate databases are available that list failure rates for a long list of equipment types and operations. These databases are produced from a large dataset of industry-wide information from hundreds of facilities. Some rates are industry-specific, such as nuclear facilities, liquefied petroleum gas facilities, or oil and gas industries, whereas some are more general. The sources included the Center for Chemical Process Safety, Lees, WASH 1400, Hydrocarbon Leak and Ignition database, and the Rijnmond Public Authority risk analysis reports, which include both equipment failures and failures due to human error. These industry-wide failure rate databases incorporate a range of equipment, differing in design standards and equipment age. Therefore, the failure rates are considered an average of a group of equipment that might include some older equipment and some relatively new equipment.

Failure rates are developed, for example, from a listing of valve breaks that have occurred in an industry. Dividing the number of breaks per year by an estimate of the number of valves in that industry can generate a failure rate. For example, this rate may be 0.003 leaks per year per valve, so that if there are 100 valves at a facility, 0.3 leaks per year or approximately one leak every 3 years could be expected. The same information is available per meter of pipe length as a function

of pipe size, for example. Other examples of this type of information include the number of times per year a pump might be expected to fail or a pump seal would develop a leak.

Rates can also be based on what is called a demand basis, which is a probability that if the equipment is called upon, it will not work. Good examples of this are the probability that a switch will not operate if it is used, or that a fire pump will not operate if it is needed.

Failure rate databases also include human error rates. These would include the frequency that a valve is not closed correctly, or that a series of instructions are not followed correctly, or that a hose is not connected properly. These human error rates are based upon industry-wide data and have been incorporated into the fault trees where applicable.

Table 4.7.1 shows frequencies for some common events in everyday life taken from the databases.

Table 4.7.1 Frequencies for Common Events

Event	Number	Type
Failure to follow instructions occurs once every	18	times it is done
Simple arithmetic error with self checking occurs once every	40	times it is done
Incorrect reading of a gauge occurs once every	222	times it is read
Fail to read a 10 digit number correctly occurs once every	167	times it is read
A switch fails to operate once every	3,333	times it is used
A welded connection leaks once every	1,142	years per weld
A computer fails to run once every	10.5	months
A propane tank explodes once every	10,000,000	years per tank

Sources: CCPS 1989b, R&MIP 1988

The failure rate databases that were used to estimate the base failure frequencies include a range of equipment types, services, and age. Many of the failure rates, for example, are based on services that are much more hazardous than oil and gas processing, such as boiler systems, piping, and Refinery reactor equipment.

Industry data on the correlation between equipment age and failure rates is sparse; in fact, several studies indicate that there is no correlation. In one study, 50 percent of failures were attributable to pressure vessels that were less than 10 years old and 50 percent were attributed to vessels that more than 10 years old (Lees 1996). This is primarily because failures occur during the first few years of equipment life due to manufacturing inadequacies. An examination of facilities regulated by the Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) (formerly the Minerals Management Service) in the Gulf of Mexico over the past 10 years shows that equipment failure rates actually decrease even as the average equipment age increases.

However, other studies indicate an increase in failure rates with age. Thomas developed a quantitative method for determining the failure rates in process piping and vessels using empirical data from the process industry (Thomas 1981). That method involves examining the piping and vessel size, construction geometry, and number and length of welds, as well as the

equipment age and maintenance practices. This method assigns an age factor as high as 1.4, meaning failure rates would increase by approximately 40 percent at the age of 20 years over the failure rate at 10 years. This method estimated that process piping leaks are due primarily to manufacture and materials selection (50 percent) and corrosion and erosion (25 percent), with fatigue, vibration, expansion, mal-operation, and shock making up the remainder (Medhekar 1993).

Since the Thomas report, a number of refinements and data development activities have occurred mostly focused on the nuclear industry. The worldwide nuclear industry has developed "risk informed in-service inspection" techniques. A number of approaches to risk informed in-service inspection have been proposed, but most of them rely on assessing the severity of process degradation mechanics and assigning a level of risk to specific processes. Developed databases, namely the SKI-PIPE for the worldwide nuclear industry, allow for a comparison to the Thomas model and databases. A study examining the SKI-PIPE database indicates that the age factor can range as high as 2.0 for larger diameter pipes in facilities older than 25 years, and as high as 2.5 for pipes subject to stress corrosion cracking environments (Lydel 2000).

The California State Fire Marshal (CSFM) pipeline study indicates that pipeline leak rates are relatively constant during the 30- to 40-year timeframe, and then increase substantially (CSFM 1993). The failure rates of the oldest pipelines are 2.8 times greater than the average.

For this study, it was assumed that as equipment ages beyond the first 10 to 20 years, to the age of more than 40 years, lack of proper maintenance would substantially increase failure rates. However, if proper maintenance practices are employed and equipment is repaired or replaced proactively, it would be assumed that base failure rates would be similar to the average rates seen in the industry. Since all age-related degradation issues (e.g., corrosion) cannot be captured by even the best maintenance programs, a factor of 2.0 has been included in the base failure rates for equipment more than 20 years old.

The average base failure rate for a group of equipment was quantified by examining the range of failure rates between the different databases (WASH, Lees, HLID, Rijnmond, and Center for Chemical Process Safety) and assigning the higher failure rates to equipment in corrosive service and receiving less maintenance. For example, the failure rates for a rupture of process piping, from a number of reputable studies range from a very high rate of once every 40,000 meter-years to a very low rate of once every 11 million meter-years (WASH1400, Lees, Center for Chemical Process Safety, and Rijnmond). This results in an average failure rate of about once every 1.9 million meter-years. The higher values are assumed to correlate to facilities that operate under corrosive service and below-standard maintenance. The lowest rates are assumed to correlate to facilities that have less- or non-corrosive service and the highest standards of maintenance. The Rail Spur Project facilities were assumed to be new with less- or non-corrosive service because they are associated with relatively sweet gas, rather than very sour gas.

Appropriate maintenance was determined from the State of California Safety Orders, the Uniform Fire Code, National Fire Protection Association (NFPA), and API, as well as industry practice. Appropriate maintenance would include:

- An established computerized maintenance management system, including record keeping, design review, maintenance checklists, diagnostics recording, preventative scheduling, and monitoring.
- For piping and pipelines, visual and ultrasonic or non-destructive testing inspections for corrosion (per API 574) and cathodic potential inspections (for underground piping), as is conducted on many pipelines utilizing smart pigs and cathodic potential systems. Pipe coating would be maintained to protect against weathering, and pipe bracing should be maintained for seismic considerations. The frequency of non-destructive testing of process piping would be a function of the corrosiveness of the service. However, a baseline should be established for older piping.
- For vessels, external and internal visual and ultrasonic testing should be conducted every 5 years. Maintenance of vessel bracing and bolting for seismic considerations. Pressure relief to safe locations, preferably closed systems.
- For atmospheric tanks, ultrasonic wall testing every 5 years, bottom examination every 10 years, and appropriate seismic design considerations to prevent failure in an earthquake.
- For valves, checking for small leaks more than once per year, since small leaks are frequently precursors to larger leaks and ruptures. Valves should also be exercised at least annually to ensure operational effectiveness, and should be refurbished periodically, including seal and seat refurbishment or replacement, according to manufacturer's recommendations. Pressure relief valves should be pressure checked annually. Pressure relief valves that fail the annual test should be retested within six months.
- For rotating equipment, such as pumps and compressors, appropriate maintenance may involve replacing seals, oil maintenance, and a number of other operations according to the manufacturers' recommendations. Also, design issues are important, such redundant systems that allow for more frequent maintenance activities, pressure relief systems that vent to a safe location, and seismic bracing for piping and equipment.
- For sensor equipment, such as lower explosion level, fire eyes, and H_2S sensors, appropriate maintenance would involve replacing sensors when new technology presents a significant improvement in reliability, and conducting quarterly inspections and testing to ensure operational effectiveness.
- For control systems, such as level, pressure, vibration, and temperature, annual testing including system actuation to ensure operation.
- Emergency shutdown systems should be checked and exercised annually.
- For fire water systems, testing and exercising annually, pressure testing water header, verification of flow alarms, fire pumps weekly inspection and annual performance test, foam system sampled and analyzed annually.

Earthquakes

During earthquakes, ground vibrations and subsequent liquefaction of the earth under structures can collapse and damage buildings and processing equipment. There is no exact correlation between earthquake Richter scale magnitude and ground acceleration values. Earthquakes measuring the same Richter scale value can generate different acceleration values, and thereby

equipment damage, depending on the depth and type of ground shaking. For example, the 1994 Northridge earthquake had a magnitude of 6.7 and a peak ground acceleration of 0.94g (g being the acceleration of gravity), whereas the 1971 San Fernando earthquake had a magnitude of 6.7 and a peak ground acceleration of 1.25g.

The distance between the epicenter and the estimated peak acceleration location can also vary. The estimated distance to the peak ground acceleration in the Northridge earthquake was double the distance in the San Fernando earthquake. The distance to the peak acceleration value can be as much as 24 miles. This indicates that areas of damage are not limited to the epicenter of an earthquake.

Equipment damage can be understood by examining damage to equipment during past earthquakes.

This report examined reconnaissance reports published by the Earthquake Engineering Research Institute for these earthquakes (the reports are not available for all earthquakes):

- Imperial in 1979;
- Northridge in 1994;
- Coalinga in 1983;
- Santa Barbara in 1978;
- Whittier Narrows in 1987; and
- Loma Prieta in 1989.

The 1987 Whittier Narrows earthquake damaged more than 10,000 buildings in the Whittier area and destroyed 123 single-family homes. The earthquake measured 5.9 on the Richter scale and produced a peak measured acceleration of 0.63g more than 6 miles from the epicenter. During the Whittier Narrows earthquake process equipment was damaged, including a large chlorine tank dislodged while being filled, releasing 240 gallons of chlorine. The reports do not state whether it was anhydrous (in a pressurized tank) or aqueous chlorine (in an atmospheric tank), although both could produce a toxic cloud of chlorine.

Among the earthquakes examined for this report, most process industry equipment damaged during the earthquakes was related to atmospheric oil or water storage tanks that ruptured or developed severe seam leaks. Piping connected to the atmospheric tanks often ruptured. Vessels that were not anchored showed some sliding and pipes leaked when the equipment shifted. However, no pressurized vessels failed and no gas liquids (e.g., propane or natural gas liquids) were released during any of the studied earthquakes.

The California Department of Conservation's Division of Oil, Gas and Geothermal Resources (DOGGR) 1984 annual report presents results of drill operator surveys in the Coalinga area to assess damage to drilling and processing equipment after the 1983 magnitude 6.3 Coalinga earthquake (with a peak ground acceleration of 0.54g measured 5 miles away, although no accelerometers were located in Coalinga). The survey indicated that more than 40 atmospheric tanks significantly leaked due to the earthquake. Impact to vessels, compressors, and processing

equipment was limited to some shifting and failed equipment tie-downs and fittings, but there were no significant material releases. Some wells sustained damage to downhole casing, but no releases occurred.

Earthquakes are difficult to assess in a QRA. Earthquakes can have a range of magnitudes and ground acceleration values, and their impact on equipment is a function of the ground shaking characteristics as well as acceleration. The approach taken in this study is similar to that used as part of the Environmental Protection Agency (EPA) Resource Management Plan and the California Accidental Release Program. Seismic probability assessments are conducted on a facility to estimate the maximum credible earthquake, and seismic engineers assess the equipment to ensure that it can withstand an earthquake of the maximum credible magnitude. Any deficiencies are corrected to ensure that the facility is seismically safe. This approach essentially assumes that, given good seismic engineering practices and design, a rupture release would not occur in the event of the largest credible earthquake. This approach is supported by the earthquake damage reports discussed that provide evidence of the advantages of good engineering design. However, it is assumed that atmospheric storage tanks would fail given a large magnitude earthquake producing peak ground acceleration values exceeding 0.50g. A peak ground acceleration value of 0.50g would occur approximately once every 5,000 years for the Project Site location, based on the US Geological Survey analysis, and this value is included in the atmospheric tank failure frequency. Failures of piping would occur if an earthquake occurred that produced a peak ground acceleration of more than 1.0 g, which would occur approximately every 30,000 years.

There are several sources of variation in the failure rate numbers. These sources include the equipment types and boundaries; the severity of the processes; the application and environment of the equipment; the equipment's age and maintenance history; construction suitability; and interpretations of data gathering at the facility levels.

The large number of variables involved and the relatively sparse information available, particularly related to age influences on equipment failure rates, necessitates a best estimate approach. Ideally, the most accurate data would be obtained from several facilities exactly like the Rail Spur Project, using the same methods to gather data, the same type of equipment, and the same services over many years. Unfortunately, failure data is not gathered specifically enough to obtain statistically significant numbers for the exact variables that match the facility. For example, all of the databases include some equipment that is old and some that is relatively new, so there is some duplication in the approach to estimating equipment failure rates and the associated rates as a function of age.

The Center for Chemical Process Safety includes the variability in frequency numbers and provides a high, low, and a mean value for a range of equipment. These ranges show that frequency numbers for equipment average a high of 3.6 times the mean, and a low of 0.0042 times the mean failure rate value.

Consequence Analysis

The consequence analysis and hazard modeling consider the physical effects of a release and its damage to people. The analysis judges the severity of potential hazards associated with accidents and their possible consequences.

Risk assessments typically evaluate fire, flammability, explosion, and toxicity. Fire and flammability hazards are relevant for flammable vapors with relatively low flash points, such as propane and methane; their hazard is usually thermal radiation from vapor jet or pool fires. In addition, larger vapor jet fires can also lead to a loss of structural integrity of other storage or process vessels. The temperature in flame jets is usually high, and flame impingement onto nearby equipment is of the greatest concern.

The release and ignition of flammable vapors may also cause an explosion. The blast overpressure hazard depends on the nature of the chemical, the strength of the ignition source, and the degree of confinement. Finally, toxic chemicals can produce adverse effects to humans. The degree of these effects depends on the toxicity of the material and the duration of the exposure.

Performing state-of-the-art hazard assessment requires a combination of sophisticated analytical techniques and extensive professional experience. The models in this analysis are the result of more than two decades of development, and they have been validated using large-scale field tests. They have also been computerized for ease of use; they operate on personal computers. While a large number of consequence models are available, only a few specific models were needed to assess the hazards identified as part of this study.

The hazard assessment models used as part of this analysis can be categorized into two groups:

- Release rate models; and
- Vapor dispersion models.

The following sections discuss the general characteristics of each of the models used in this analysis. Specific models used in the analysis were selected based on the scenarios identified in the hazard identification task.

Release Rate Models
Several models were utilized to simulate potential releases of gas, liquefied petroleum gas, natural gas liquids, and crude vapor, and two-phase releases from pipes and vessels.

One of the first steps in consequence modeling is to establish the source terms (i.e., release rate, temperature, pressure, and velocity) associated with each scenario. The release rate is the rate at which the material is released from the pipe or vessel to the atmosphere. Before the source terms can be estimated for each scenario identified in the hazard analysis, the thermodynamic and physical properties of each hydrocarbon stream must be characterized. The thermodynamic and physical properties of the hydrocarbon streams were estimated using the IoMosaic SuperChems™ model, which utilizes numerous thermodynamic and physical property estimation techniques.

The SuperChems™ model simulates the release of multi-component liquid and vapor streams characteristic of the potential releases associated with the facility. For this study, these models are useful in assessing the effect of multi-component streams on vapor cloud flammability characteristics.

Steady and Non-Steady Release from a Pressurized Vessel or Pipeline

These numerical steady and non-steady state flow models are used to compute multi-component liquid and vapor release rates from a ruptured valve or pipeline. The steady-choked and un-choked flow models compute a single release rate assuming uniform pressure and temperature in the vessel; in most blow-down processes from pressure vessels, the pressure inside is sufficiently high that choked flow (i.e., releases at sonic velocity) conditions exist during most of the blow-down period. However, in smaller pressure vessels, or for relatively larger release rates, the conditions inside the vessel are not steady. The pressure drop influences the flow velocity and, thus, the mass flow rate. In addition, the density and temperature inside the vessel are also changing. The unsteady state models compute a time-dependent release rate profile based on the chemical component properties.

The modeling method for release rate is to simulate the initial and the average release rate from a pipe or vessel rupture based on the operating conditions: the temperature, pressure, and composition. The initial release rate is then assumed to be steady for the duration of a flammable release (the average release rate is used for a toxic release) until the process inventory is expelled or a system shutdown intervenes. This model was used to estimate tank car spill rates.

Pool/Tank Fire Modeling Methodology

The thermal radiation hazards from hydrocarbon pool fires depend on a number of parameters, including the composition of the hydrocarbon mixture, the size and shape of the fire, the duration of the fire, its proximity to the object(s) at risk and the thermal characteristics of the object exposed to the fire. Estimating the thermal radiation field surrounding a fire involves the following three major steps:

- Geometric characterization of the pool fire which involves the determination of the burning rate and the physical dimensions of the fire. In calculating thermal radiation, the size/shape of the fire implies the time-averaged size of the visible flame envelope (i.e., not obstructed by smoke). Field experiments have shown that the non-visible parts of the fire radiate less than 10% of the total radiation from a hydrocarbon pool fire.
- Characterization of the radiative properties of the fire which involves the estimating the average irradiance of the flames. The intensity of thermal radiation emitted by pool fires depends on a host of parameters including fuel type, fire size, flame temperature, and composition. The major sources of radiative emissions in large pool fires are water vapor, carbon dioxide and soot.
- Calculation of radiant intensity at a given location. This is accomplished once the geometry of the fire, its radiation characteristics and the location, geometry and orientation of the receiver are known. For large distances (hundreds of meters), the absorption of thermal radiation in the intervening atmosphere becomes appreciable. This is dependent on the path length, flame temperature and atmospheric relative humidity.

Several pool fire scenarios were considered in the analysis including; a fire in the oil storage tank, a fire in the diked area surrounding the storage tank resulting from storage tank failure and ignition and a fire following the derailment of a tank car. These scenarios were simulated using the SuperChemsTM consequence modeling package developed at Arthur D. Little, Inc.

Fires in blended hydrocarbon mixtures, especially those whose components differ widely in their volatility, do not burn at a uniform rate. In the beginning, the burning rate is characteristic of the high volatile component. During the middle portion of the burning, the less volatile component still must be brought to the boiling point of the blend. Finally, as the fractionation proceeds, the burning rate becomes characteristic of the higher boiling fraction.

Radiative properties of the fire were based on a detailed analysis of typical crude oil that would be delivered via rail. This information was used to simulate the fractionation of the burning hydrocarbon mixture, and the progressive decrease in thermal radiation intensity over time. The initial pool geometry for each model simulation was based on the area and shape of the storage tank and diked area. Several meteorological conditions were also simulated to obtain a worst-case estimate of thermal radiation hazards.

Several pool fire scenarios were considered in the analysis which included potential spill sizes of to 30,000 gallons. These scenarios were simulated using the SuperChems consequence modeling package developed at Arthur D. Little, Inc. It should be noted that any fire that occurs would be likely to be restricted to the location of the spill. A flammable vapor cloud moving downwind from a crude oil spill is not expected to arise since the small quantities of flammable vapors evolving would disperse very rapidly. Calculations were made based on the following assumptions:

- Ambient temperature 305 K
- Discharge temperature of 350 K
- Unlimited pool radius
- Average flame temperature of 1,000 K
- Burning rate of 0.228 mm/s for light crude oil.

Boiling Liquid Expanding Vapor Explosion Model

A boiling liquid expanding vapor explosion is a sudden loss of containment of a liquid that is above its boiling point (at atmospheric conditions). A boiling liquid expanding vapor explosion results in a sudden, vigorous liquid boiling and the production of a shock wave. Liquids stored under pressure (such as the gas liquids) fall into this category as well as any liquid that is stored at an elevated temperature above its boiling point. The main hazards presented by liquids stored under pressure are fireball and radiation.

Boiling liquid expanding vapor explosions were modeled using the SuperChems™ model for fireballs. The approach estimates the total energy that could be produced by the material combustion and the duration of the explosion. Impacts are estimated by integrating the energy flux over the time that the explosion occurs at different distances from the source of the explosion. Overpressure due to boiling liquid expanding vapor explosion was also estimated assuming the vessel fails due to overpressure, and the resulting shockwave is dissipated into the environment. The larger of the hazard zones pertaining to boiling liquid expanding vapor explosions (either overpressure or thermal radiation) was used to estimate risk.

Recent incidents indicate the extent to which gas liquid releases can cause impacts. In December 2006, a propane gas leak in a Milwaukee plant led to an explosion, killing three people and injuring 46 others. The explosion knocked workers off their feet, broke windows in nearby houses and businesses, and scattered burning debris over several blocks. Concussions from the blast were felt miles away (LA Times 2006).

A 1998 incident in Iowa provides valuable lessons regarding propane tank fires and boiling liquid expanding vapor explosions. Vehicle impact sheared ¾ liquid pipe off of an 18,000-gallon propane tank. The excess flow valve on the line was not sized correctly and did not close. The resulting fire engulfed the tank, subsequently causing a boiling liquid expanding vapor explosion. Fire department personnel set up too close to the tank (100 feet) and two people were killed. Fragments thrown from the blast caused additional fatalities.

An incident on October 6, 2007, in Tacoma, Washington, involved a propane tanker truck and propane storage vessels. Reports indicate that a propane-truck driver off-loaded propane that may have leaked. Nearby welding may have created sparks that ignited the fumes. The propane tanker subsequently exploded, apparently damaging the propane storage tanks. The thermal impacts to the propane storage tanks caused the pressure relief devices on the propane storage tanks to relieve, sending a flame jet high into the air. The tanks continued to vent propane and produce a flame jet for multiple hours. The explosion was so intense that part of the tanker truck landed on a nearby highway. Video of the explosion was available on the internet. Video taken approximately 0.25 miles from the explosion indicated a large fireball. However, no overpressure impacts were felt at the video location except for car alarms activated by the pressure wave.

This incident serves to highlight the type of impacts that external events can have on active firefighting equipment, such as deluge systems. The explosion of the propane truck or the flame jets and high thermal impacts of releases effectively would have destroyed any fire-fighting capability of the deluge system. This is why deluge systems are assigned a relatively high failure rate in the fault trees.

A recent crude oil incident in Lac-Mégantic, Canada occurred when an uncontrolled crude oil unit train derailed. On July 6, 2013 an unattended crude oil unit train consisting of 72 loaded tank cars and five locomotives ran eight miles downgrade (1.2 percent grade) into downtown Lac-Mégantic. 63 tank cars derailed, resulting in approximately 1.5 million gallons of crude oil being spilled and subsequently ignited. Several derailed tank cars released product resulting in multiple explosions and fires causing 47 fatalities, extensive damage to the town centre and precipitated the evacuation of about 2,000 people from the surrounding area. While non-pressurized tank cars typically do not pose a significant explosion hazard, several of the DOT-111 tank cars that did not fail as a result of the derailment, subsequently failed due to overheating and over-pressurization caused by the spilled crude oil pool fire.

Fatality and Serious Injury Rates

Since the release streams are flammable, releases could potentially result in thermal radiation exposure from a fire, and also present an overpressure hazard due to explosions from flammable vapor clouds or boiling liquid expanding vapor explosions. Damage criteria were developed in

order to quantify the potential consequences of an accidental release. Damage criteria are defined as the levels of exposure that could produce fatalities and produce serious injuries.

Serious injury is defined as an impact from the exposure that could require medical intervention and could produce effects that last significantly longer than the duration of the exposure. An injury such as lung damage that would require hospitalization and/or other types of therapy would be considered a serious injury.

Thermal Radiation Damage Criteria

The potential concern associated with large-scale compressed gas vapor jet fires is thermal radiation intensity, and its effects on persons, the surrounding structures, processes, and fire suppression equipment. Table 4.7.2 presents an overview of thermal radiation intensity and observed effects.

Table 4.7.2 Thermal Radiation Serious Injury and Impacts

Intensity (kW/m^2)	Impact
1	Time for severe pain - 115 seconds Time for second-degree burns - 663 seconds [a]
1.6	No discomfort for long exposure [b]
2	Time for severe pain - 45 seconds Time for second-degree burns – 187 seconds [a]
3	Time for severe pain - 27 seconds Time for second-degree burns - 92 seconds [a]
4	Time for severe pain - 18 seconds Time for second-degree burns - 57 seconds [a]
5	Time for severe pain - 13 seconds Time for second-degree burns - 40 seconds [a]
10	Time for severe pain - 5 seconds Time for second-degree burns - 14 seconds Time for 100% fatality - 270 seconds [a c]
12.5	Melting of plastic tubing [b]
25	Minimum energy to ignite wood [b]
37.5	Damage to process equipment [b]
100	Time for severe pain - <1 seconds Time for second-degree burns - 1 sec Time for 100% fatality - 11 seconds [c]

a. Based on Handbook of Chemical Hazard Analysis Procedures, FEMA. b. CCPS Chemical Process Quantitative Risk Analysis. c. CCPS Chemical Process Quantitative Risk Analysis using probit equation by Eisenberg

Data presented in this table shows that no considerable physical effect would result from exposure to a radiation intensity between 1 and 1.6 kW/m^2 over extended periods. Exposure to a radiation intensity of 5 kW/m^2 would result in pain if the exposure period were to exceed 13 seconds, and it would result in second-degree burns after 40 seconds. Exposure to a radiation intensity of 10 kW/m^2 would result in pain (5 seconds) and second-degree burns after short exposure periods (i.e., 14 seconds), and death after longer periods. The time required to reach pain, second-degree burn, and fatality thresholds were used to estimate radiation levels that would result in serious injury or fatality. Persons exposed to thermal radiation have the opportunity to move away from the hazard, unlike overpressure effects or vapor cloud fires and

explosions, which are instantaneous. It was assumed in this analysis that some people not within the flame area would move away from the flame to get away from the heat. Analysis of the distances to various radiation levels indicates that this is feasible. Therefore, a less than 1 minute exposure was used as the basis for determining the damage criteria. Exposure to a thermal radiation level of 10 kW/m^2 could result in a serious injury (at least second-degree burns) if exposed for less than 1 minute, and it was, therefore, assumed that all persons exposed to 10 kW/m^2 would suffer serious injuries. Serious injuries would start to be realized at and above 5 kW/m^2. Exposure to thermal radiation levels in excess of 10 kW/m^2 would likely begin to generate fatalities in less than 1 minute. All persons exposed to thermal radiation within the flame area were assumed to suffer fatalities regardless of exposure duration.

Flammable Vapor Criteria

A release of flammable material can produce impacts by producing a cloud of the flammable material that, if it encounters an ignition source, either explodes or burns (deflagration) back to the material source. Persons located within the cloud when it explodes or burns could be seriously impacted. Whether the cloud explodes or burns is a function of the material and the level of confinement in the environment in which the cloud is located (e.g., within pipe racks, between buildings).

All release scenarios from the Rail Spur Project could contain flammable vapors. Potential ignition sources onsite are primarily located in the gas plant with fewer ignition sources throughout the field mostly associated with drilling or well workover operations or compressors or pumps.

Several biological and structural explosion damage criteria were reviewed, specifically the Center for Chemical Process Safety "Evaluating Process Plant Buildings for External Explosions and Fires" and Center for Chemical Process Safety "Chemical Process Quantitative Risk Analysis." This reference indicates that persons within a structure suffer considerably more damage than persons in the open due to overpressures. This is primarily due to secondary object impacts. Table 4.7.3 details the levels of impacts at various overpressure levels to buildings, equipment and persons.

An overpressure level of 0.3 psi would likely result in broken windows and some potential for serious injury. Complete structural damage and serious injury/fatality could occur for wooden buildings and unreinforced masonry as a result of exposure to an overpressure level of 1.0 psi. An overpressure level of 5.0 psi would result in structures being completely destroyed and an estimated 100 percent serious injury/fatality to building occupants.

Deflagration of the vapor cloud would produce impacts to persons located within the flammability limits of the vapor cloud. Persons located within the lower flammability limit would most likely suffer at least serious injuries. As there is some natural variability within the cloud, it is assumed that persons located within the area that would be encompassed by a level of concern equal to one-half the lower flammability limit (a larger area than the lower flammability limit area) would suffer serious injuries.

Table 4.7.3 Overpressure Damage

Overpressure Level	Impact
0.04	Loud noise, sonic boom (143 dBA)
0.15	Glass breakage
0.30	Center for Chemical Process Safety projectile limit, 10% broken window glass, 95% no serious damage
1.0	Wood trailer roof and walls collapse Unreinforced masonry building partial collapse Estimated 10% injury rate
5.0	Wood trailer completely destroyed Unreinforced masonry building completely destroyed Utility poles snapped Estimated 100% injury rate
6.0	Reinforced building major damage/collapse Estimated 40% fatality rate
7.0	Loaded train wagons overturned
12.0	Reinforced building completely destroyed Estimated 100% fatality rate
15.0	Lung hemorrhage, lower range of direct human fatalities

Source: CCPS 1989

Table 4.7.4 details the criteria selected for the risk analysis for both fatalities and serious injuries. In this table, the zero percent fatality or serious injury level is the level at which fatalities or serious injuries could begin to occur.

Fixed Facility Risk Analysis

The results of the failure rate and consequence analysis are finally combined to develop risk profile curves (plots of frequency versus the number of fatalities or serious injuries). These risk profile curves are commonly called risk profiles and represent "societal risk." This is the risk that a person could sustain serious injury or fatality. In calculating the risk profiles, a computer model is used that looks at the probability of the hazard occurring, the associated hazard zones, population distribution, meteorological conditions, and probabilities of ignition. The output of the model is the likelihood of an individual fatality or injury occurring.

To develop the risk profile, many factors were considered. Each release scenario is evaluated for all wind directions, and for each combination of stability and wind speed. In any given direction of travel, the chances of having the particular wind stability class, the cloud igniting on-site, and the cloud igniting offsite at every downwind location from the release site was evaluated. The frequency of attaining the maximum downwind distances for flammable vapor dispersion will be reduced if the vapor cloud encounters ignition sources at the point of release or at any point along its travel path.

Table 4.7.4 Fatality and Serious Injury Rates

Event	Fatality	Serious Injury	Reference
Vapor Cloud Fire	30% fatality within the lower flammability limit	100% injury within the lower flammability limit 50% injury within ½ lower flammability limit	Assumes 30% of the population is outdoors and would suffer 100% fatalities within the lower flammability limit. Assumes indoor population would not suffer more than serious injury due to subsequent fire and damage. Outdoor population percentage estimated.
Thermal Radiation Jet Fire or Pool Fire	100% fatality within flame jet area 10% fatalities at 10 kW/m^2	100% injury at 10 kW/m^2 10% injury at 5 kW/m^2	Based on Handbook of Chemical Hazards Analysis Procedures, exposure to 10 kW/m^2 produces second-degree burns in 14 seconds, 10% fatalities at 60 seconds based on Eisenberg Probit Equation (1975). Injury based on time to second-degree burns of less than 1 minute for 10 and 5 kW/m^2.
Boiling Liquid Expanding Vapor Explosion: Radiation Dosages	1% fatalities at 250 kJ/m^2	100% injury at 150 kJ/m^2 10% injury at 40 kJ/m^2	Based on total energy integration over boiling liquid expanding vapor explosion duration using the jet fire energy rate.
Explosion: Over Pressure	10% fatalities at 1 psi	5% injury at 0.3 psi	Based on Center for Chemical Process Safety Process Plant Buildings (Table 4.8) where occupants of a building experience 10% fatality at 1 psi for an unreinforced masonry or wood framed building. Injuries produced at 0.3 psi overpressure assumed to be 5% as per the probability of serious damage.
Toxic	1,000 ppm 10% fatality	100 ppm 10% injury	Estimated based on OSHA exposure limits and animal studies.

Notes: kW/m^2 = kilowatts per square meter; kJ/m^2 = kilojoules per square meter; psi = pounds per square inch; ppm = parts per million

The approach used by the risk model follows these basic steps:

- Summarize meteorological data into representative wind direction, wind speed and stability conditions;
- Construct a model of the site and surrounding area, including populations and population densities;
- Identify the ignition sources and enter the ignition probabilities;
- Select the release events, along with the likelihood of release, consequence data and release locations;
- Determine the event trees; likelihood and consequences of immediate ignition, vapor cloud fires, jet fires, and explosions as appropriate, for each condition;
- Determine the probability of ignition at each point along the path of a dispersing vapor cloud;
- Select another release event and repeat the preceding three steps;

- Apply conditional probabilities of fatality given exposure, for each type of consequence (i.e., thermal exposure, vapor cloud exposure);
- Aggregate the likelihood of all probabilities of fatality at each location in the model for all the release scenarios; and
- Construct risk profiles, or frequency number, of fatality curves by summing the number of fatalities for each event outcome and plotting the results against the frequency. This was also done for serious injuries.

Meteorological Data
Meteorological data is used for the closest monitoring location. Atmospheric stability classes D and F are selected as characteristic wind stability conditions. Based on wind speed conditions for these stability classes, a wind speed of 4.0 m/s is usually selected for stability class D (neutral atmospheric stability), while a wind speed of 2.0 m/s was selected for stability class F (stable atmospheric conditions).

Population Data
Population information is gathered for locations within 0.5 miles of the Project Site. These locations are listed, along with the estimated populations, population densities, and ignition probabilities.

Populations at these areas were entered into the Quantitative Risk Assessment Model. Information was gathered from site visits, estimates of populations from housing counts generated from aerial photographs, and from Census data.

Ignition Probabilities
Flammable vapor clouds have the potential to ignite anywhere within their flammable limits. Hence, it is necessary to identify potential ignition sources that a cloud may encounter, and to quantify the likelihood of ignition if the cloud encompasses these sources. When determining ignition probabilities, there are two factors to take into account; source duration and source intensity. Source duration is the fraction of time that the source is present or in operation. Source intensity is the chance of the source actually causing ignition if contacted by a flammable cloud. For example, if a ground level flare is operating, it will almost always ignite a cloud, but it may only operate ten percent of the time. This would generate an overall chance of ignition by the ground level flare of 0.1 (or 10 percent).

In general, when trying to identify ignition sources, the search is primarily for open flames, hot surfaces and electrical sparks, and, to a lesser extent, friction sparks from both continuous and intermittent activities. Extensive listings of potential ignition sources and estimates of ignition probabilities may be found in the literature (CCPS 1989, UK 2004).

Typical ignition probabilities that were used in the analysis include:

- Cars – 0.06 per car; although many potential ignition sources within a car, such as faulty wiring or backfires, are due to fuel rich mixtures in intake air, they are not always present nor guaranteed to cause ignition. This value was also applied to golf carts (CCPS).

- Houses – 0.01 per house; while there are many ignition sources within a home (switches, doorbells, faulty wiring, pilot lights, smoking materials, fireplaces, and stoves), the flammable vapors must first penetrate the house before these ignition sources pose a hazard. Typical residence times of clouds are brief enough that this is relatively unlikely (CCPS).
- Industrial Areas – 0.1 for light industrial, 0.25 for medium industrial and 0.5 for heavy industrial areas. Heavy industrial areas are classified as having large motors, high temperature surfaces and open flames (UKHSE 2004).

In order to estimate the number of vehicles, traffic counts for particular roads were used along with average speeds to determine the density of vehicles per mile and probabilities of ignition along roadways.

The onsite equipment that would most likely produce ignition would be equipment such as compressor motors or flares. Releases of materials that, due to wind direction, move over these sources are assumed to experience ignition and not travel offsite.

Post Accident Event Trees

Event trees are used to determine the fate of a released material after the release has occurred. A release of a flammable material, for example, could experience instantaneous ignition leading to a flame jet. It could also disperse downwind, encounter an ignition source and burn or explode, or it could disperse safely. Table 4.7.5 shows the probability of each of these scenarios for rupture and leak events. These probabilities are based on Center for Chemical Process Safety recommendations (CCPS 1989). Larger releases, which involve greater energies associated with metal failure and/or impacts, have a higher probability of igniting at the source and causing a flame jet than smaller releases.

Construction of Risk Profiles

Risk profiles display the frequency with which public safety impacts/consequences (e.g., fatalities or serious injuries) exceed a given magnitude. They can be used to show property damage (among others), but are generally used for public safety impacts. The risk profiles indicate accident size (based on numbers of persons affected) and display how the potential number of fatalities varies as a function of frequency. Risk profiles are generally plotted on logarithmic scales because they span multiple orders of magnitude.

There are many sources of uncertainty that affect the risk profiles. These uncertainties include:

- Release frequency;
- Release size;
- Population impacts, including distribution and likelihood of fatality/serious injury;
- Behavior of the release (jet mixing versus passive dispersion);
- Accuracy of the hazard models; and
- Ignition sources and probabilities.

Table 4.7.5 Event Tree Probabilities

Event Tree: Rupture Events (large releases > 50 kilograms per second)

Event	Probability
Immediate Ignition	0.25
Vapor Cloud with Flash Fire	0.75

Event Tree: Leak Events (smaller releases <50 kilograms per second)

Event	Probability
Immediate Ignition	0.10
Vapor Cloud with Flash Fire	0.90

Event Tree: Gas Liquids Releases

Event	Probability
Immediate Ignition	0.08
Vapor Cloud with Flash Fire	0.90
Explosion/boiling liquid expanding vapor explosion	0.002 - .07*

* - depends on configuration
Source: CCPS 1989

The release frequencies and sizes are the most important contributors to overall uncertainty. Changes in failure rates will directly influence the risk profile. A doubling of the event frequencies would double the probability of fatalities. Changes in the relative sizes of leaks and ruptures will influence the risk profile, but to a lesser extent. The assumptions concerning population distribution and ignition probability also influence the risk profiles.

Transportation Risk Analysis

For the public safety analysis, the study area includes the existing rail facilities and routes. The existing sources of risks include current operations at the SMR, truck transportation of hazardous materials, crude oil pipelines and the existing rail facilities. The proposed rail facility will introduce additional transportation hazards associated with rail transportation to the site.

Estimating the transportation risks involves the following steps:

1. Dividing the routes into segments based on the associated population densities and urban and rural characteristics;
2. Applying accident rates to each route segment;
3. Applying release probabilities to the accidents;
4. Developing the consequences of releases on the surrounding populations along each segment;
5. Applying accident-related trauma impacts for injuries and fatalities; and
6. Developing risk estimates.

Rail risks include the rate of accidents, conditional probabilities of releases, and fatality and injury rates.

Rail Routes and Population Density

The UPRR traverses San Luis Obispo County in a north-south direction and passes through the main urban areas of the county (see Figure 4.7-2). For the risk analysis, the rail route was divided into 41 different segments based on population density using the categories listed in Table 4.7.6.

Table 4.7.6 Representative Default Population Densities

Designation	Density	Description
Remote	20 people/sq mile	Nonmetropolitan area with scattered housing; farms
Rural	100 people/sq mile	Small village or town; recreation areas
Suburban	1000 people/sq mile	Typical suburbs; mixed use areas
Urban	3000 people/sq mile	Small city; densely populated suburbs; congested commercial areas
High	10,000 people/sq mile	Very dense city area

Source: CCPS, 1995.

Rail Type and Car Type

Rail track is classified into six categories with Class 6 having the most stringent track tolerances and maintenance schedules. Mainline track is generally Class 5 or 6 and has the lowest accident rate per million miles. Yard track can have an accident rate of 100 times mainline rates (DOT, 2000). The primary factor associated with rail accidents was track condition and other vehicles on tracks at crossings (CTSB, 2003).

Rail car types for crude oil are DOT-111 non-pressurized tank cars (DOT 111A60W1). DOT-111 tank cars for crude oil service have a maximum capacity of 30,000 gallons. Following an accident in Illinois in 2009, the NTSB made a number of safety recommendations to both the American Association of Railroads (AAR) and the DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) regarding DOT-111 tank cars. The NTSB recommended to PHMSA that it require modifications be made on all existing and new DOT-111s. PHMSA did not mandate a fleet retrofit, nor has it published new standard designs for crude and ethanol tank cars. The AAR-North American Tank Car Committee, independent of a federal mandate, implemented nearly all of the recommendations made to PHMSA in its design standards for new crude oil and ethanol tank cars ordered after October 2011. Specifically, all new DOT-111 tank cars for ethanol and crude oil service beginning October 1, 2011 are required to have:

- Increase head and shell thickness;
- Normalized steel;
- ½-inch thick head shield; and
- Top fitting protection.

The NTSB also recommended the AAR review the design requirements for attaching center sills or draft sills for all tank cars. The AAR-North American Tank Car Committee has studied the stub sill issue and will revise those standards as recommended. Nearly 25 percent of the DOT-111 fleet carrying crude today meets the higher design standards, as outlined above.

Figure 4.7-2 UPRR Route and Population Densities

Accident Rates

Train accidents are required to be reported to the Federal Railroad Administration (FRA) and typically identify the causes and contributing factors (see Table 4.7.7).

Table 4.7.7 Rail Incidents-Initiating and Contributing Causes

Human Errors	Equipment Failures	System or Procedural Failures	External Events
Humping	Nondedicated car	Routing	Vandalism/sabotage
Switching	Crossing guard failure	Control	At-grade crossing
Coupling	Overpressure	-yards	Flood/washout
Transloading	Leaking valve	-mainline	Earthquake
Inerting	Roller bearing failure	-in-plant	Rockslide/landslide
Contamination	Coupling failure	Interim storage at holding track	Avalanche
Heating and cooling	Broken rail	Car tracking	Fire on rail siding
Overfilling	Brake failure	Container specification	Fog/blizzard
Speeding	Roadbed failure	Emergency response training	Bridge failure
Ignoring closed	Protective coating/ insulation/thermal protection failure	Maintenance	
Block signals	Relief device failure	Inspection	
Driver impairment	Track sensor failure	Circuitous routing	
	Switchgear failure		
	Signal failure		
	Communications system failure		
	Broken wheel		
	Suspension failure		
	Fitting defect		
	Corrosion		
	Material defect		
	Bad weld		

Source: CCPS, 1995.

The transportation of hazardous substances poses a potential for fires, explosions, and hazardous materials releases. In general, the greater the miles traveled the greater the potential for an accident. Statistical accident frequency varies. The size of a potential release is related to the maximum volume of a hazardous substance that can be released in a single accident, should an accident occur, and the type of failure of the containment structure, e.g., rupture or leak. The potential consequences of the accident are related to the size of the release, the population density at the location of the accident, the specific release scenario, the physical and chemical properties of the hazardous material, and the local meteorological conditions.

The FRA regulations on reporting railroad accidents/incidents are found primarily in 49 CFR Part 225. The purpose of the regulations is to provide FRA with accurate information concerning the hazards and risks that exist on the nation's railroads. The FRA uses this information for regulatory and enforcement purposes, and for determining comparative trends of

railroad safety. These regulations preempt states from prescribing accident/incident reporting requirements.

The FRA compiles data on railroad-related accidents, injuries and fatalities to depict the nature and cause of rail-related accidents and improve safety. Train accident data reported in the United States, in California, and accidents reported by UPRR between 2003 and 2012 are summarized in Table 4.7.8. Based on the train accident data for the United States, the train accident rate varied from 2.3 accidents per million miles traveled to 4.4 accidents per million miles traveled over the 10-year period from January 2003 to December 2012. The train accident rate for 2012 was 2.3 train accidents per million miles traveled. However, the train accident rate on mainline Class 5 and 6 tracks was lower at 1.0 train accidents per million miles traveled. Of the train accidents reported during the 10-year period (a total of 128,974), less than one percent of the train accidents resulted in a release of hazardous materials (287/128,974 = 0.0022 or 0.22%).

Train accident data reported for San Luis Obispo County are also presented in Table 4.7.8, and show that there have been very few incidents between 2003 and 2012. Most of the injuries and fatalities that have occurred have been associated with employees and trespassing-related injuries and fatalities. There were no train accidents or HAZMAT spills during the 2003-2012 period.

Injury and Fatality Rates

As rail traffic would occur regardless of whether additional crude oil cars were added to the train, the transportation of crude oil would not increase the accident/trauma-related injuries and fatalities associated with rail accidents. The CTSB Study indicated that fatalities, generally associated with crossings and trespassing, occurred at a rate of 1.0 fatality and 0.9 injuries per million train miles.

Accident vs. Hazmat Release Impacts

The vast majority of rail-related injuries and fatalities are associated with trauma due to train impacts to persons on or near railroad tracks. As the injury and fatality rates above show, the odds of experiencing a train-related fatality or injury are 10 to 20 times greater than experiencing a release of material. The CTSB statistics show that, between the years 1999 to 2003, there were 176 injuries and fatalities while there was an average of seven "dangerous goods" release accidents nationally.

Rail Crossings and Accidents

There are currently 99 active railroad crossings in San Luis Obispo County. Of these crossings, 33 are grade separated crossings where the roadway passes below or above railroad and the potential for a train-vehicle accident is remote.

At-Grade railroad crossing create a situation where adverse train, vehicle and/or pedestrian interactions can occur. There are 25 public at-grade crossings in San Luis Obispo County, all of which are equipped with signalized gated crossings (See Table 4.7.9 and Figure 4.7-3). Over the past ten years (2003-2012) two public crossing accidents have occurred, resulting in one fatality.

Table 4.7.8 Summary of National and California Train Accident Data

Category	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Train Accident Data for United States										
Total Accidents/ Incidents[1]	14,371	14,523	14,311	13,803	13,936	12,958	11,263	11,628	11,434	10,747
Accident Rate[2]	19.3	18.9	18.1	17.0	17.6	16.7	16.9	16.5	15.9	14.5
Train Accidents	3,019	3,385	3,266	2,998	2,693	2,482	1,911	1,902	2,019	1,712
Train Accident Rate[2]	4.1	4.4	4.1	3.7	3.4	3.2	2.9	2.7	2.8	2.3
Train Accidents on Main Line	976	1,033	1,021	981	854	767	619	616	619	489
Accident Rate on Main Line	1.5	1.5	1.5	1.4	1.2	1.1	1.1	1.0	1.0	0.7
Hazmat Releases[3]	30	31	39	30	46	22	22	21	21	25
Cars Carrying Hazmat[4]	7,790	8,185	8,034	9,000	8,562	8,451	6,440	7,509	7,582	6,680
Hazmat Cars Damaged/Derailed	1,072	998	915	1,047	1,056	751	749	719	666	661
Cars Releasing	41	49	52	71	76	38	44	40	66	45
Total Train Miles[5]	743.3	770.2	789.0	813.6	793.6	774.1	668.0	704.8	717.6	740.4
Train Accident Data for UPRR										
Total Accidents/ Incidents[1]	2,562	2,708	2,747	2,749	2,597	2,287	1,696	1,708	1,738	1,718
Train Accidents	801	960	955	891	723	637	444	447	547	501
Hazmat Releases	8	7	12	5	6	5	3	4	4	6
Train Accident Data for California										
Total Accidents/ Incidents[1]	1,002	865	965	944	950	843	727	720	704	807
Train Accidents	175	185	199	191	155	120	101	87	88	83
Hazmat Releases	1	3	2	3	4	1	1	1	0	0
Train Accident Data for San Luis Obispo County										
Total Accidents/ Incidents	9	10	3	7	15	7	9	8	7	6
---Total fatalities	2	.	2	1	1	.	1	3	.	2
---Total nonfatal	6	10	1	6	12	6	8	6	7	5
EOD deaths	.	.	.	.	.	.	.	.	.	.
EOD injuries	3	3	.	2	2	3	.	1	.	.
EOD illnesses	.	.	.	.	1	.	.	.	.	.
Total EOD cases	3	3	.	2	3	3	.	1	.	.
Cases with days absent from work	3	3	.	2	1	2	.	1	.	.
Trespasser deaths, not at Rail Crossing	2	.	2	1	1	.	.	3	.	.
Trespasser injuries, not at Rail Crossing	.	.	.	3	3	1	1	4	.	1

Table 4.7.8 Summary of National and California Train Accident Data

Category	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Train Accidents	.	.	.	.	.	.	.	.	.	.
--- deaths	.	.	.	.	.	.	.	.	.	.
--- injuries	.	.	.	.	.	.	.	.	.	.
HAZMAT Releases	.	.	.	.	.	.	.	.	.	.
--- Hazmat cars	.	.	.	.	.	.	.	.	.	.
--- Cars damaged	.	.	.	.	.	.	.	.	.	.
--- Cars releasing	.	.	.	.	.	.	.	.	.	.
Highway Rail Incidents	1	2	.	.	2	2	1	.	.	1
--- deaths	.	.	.	.	.	.	1	.	.	2
--- injuries	.	2	.	.	.	1	.	.	.	.
--- at public crossing	.	.	.	.	1	.	1	.	.	.
Other Accidents/ Incidents[1]	8	8	3	7	13	5	8	8	7	5
--- deaths	2	.	2	1	1	.	.	3	.	.
--- injuries	6	8	1	6	12	5	8	6	7	5

Source: Federal Railroad Administration, Office of Safety Analysis data reports.
http://safetydata.fra.dot.gov/officeofsafety/publicsite/query/tenyr1a.aspx

(1) Total accident/incidents include train accidents, highway-rail accidents, and other incidents.
(2) Events per million train miles.
(3) Number of accidents involving a hazmat release.
(4) Number of rail cars that released hazardous materials.
(5) Number in million train miles.

Table 4.7.9 Public At-Grade Rail Crossings

Number	Street	City	Devices	Latitude	Longitude
1	14th St.,(A.K.A. River St.)	Unincorporated	Gates	35.753	-120.695
2	11th St	Unincorporated	Gates	35.749	-120.696
3	Wellsona Rd	Unincorporated	Gates	35.696	-120.692
4	21st St	Paso Robles	Gates	35.636	-120.689
5	16th St	Paso Robles	Gates	35.631	-120.688
6[1]	**13th St**	**Paso Robles**	**Gates**	**35.628**	**-120.688**
7[2]	**12th St**	**Paso Robles**	**Gates**	**35.627**	**-120.688**
8	10th St	Paso Robles	Gates	35.625	-120.688
9	Creekside Ranch Rd	Unincorporated	Gates	35.560	-120.695
10	Chico Rd	Atascadero	Gates	35.515	-120.679
11	Curbaril Av	Atascadero	Gates	35.489	-120.648
12	Halcon Rd	Unincorporated	Gates	35.460	-120.628
13	Santa Clara Rd	Unincorporated	Gates	35.443	-120.611
14	Asuncion Rd	Unincorporated	Gates	35.431	-120.604
15	Estrada SR 58	Unincorporated	Gates	35.393	-120.605
16	Encina St	Unincorporated	Gates	35.391	-120.607
17	Wilhelmina Av	Unincorporated	Gates	35.386	-120.617
18	Foothill Blvd	San Luis Obispo	Gates	35.295	-120.664
19	Marsh St	San Luis Obispo	Gates	35.284	-120.654
20	Orcutt Rd	San Luis Obispo	Gates	35.261	-120.645
21	Grand Av	Grover City	Gates	35.122	-120.629
22	Beach St (Aka Railroad St.)	Unincorporated	Gates	35.099	-120.614
23	22nd St	Unincorporated	Gates	35.095	-120.607
24	Oso Flaco Lake Rd	Unincorporated	Gates	35.015	-120.582
25	Division St	Unincorporated	Gates	34.991	-120.567

1. On January 13, 2009 at 1:30 PM by a passenger train traveling at a speed of approximately 70 mph struck and killed an 81 year old male.
2. On September 26, 2007 at 5:00 PM a passenger train traveling at a speed of approximately 15 mph struck a pickup truck stopped on the crossing. There were no injuries or fatalities.

Figure 4.7-3 Public At-Grade Rail Crossings

There are 41 private at-grade crossings in the County, as shown in Table 4.7.10 and Figure 4.7-4. Three of these crossings have signalized crossing gates, while the rest have no active controls. These rail crossings typically have "Stop" and "Railroad Crossing" signs on the road to warn drivers. Private crossing #39 is located on the SMR property, and is an uncontrolled crossing. Over the past ten years (2003-2012) seven private crossing accidents have occurred, resulting in three injuries and two fatalities.

Of the nine rail crossing accidents that occurred between 2003 and 2012, six involved a passenger train, with the remaining three involving freight trains.

Trespassing Accidents
Trespassing along railroad rights-of-way is the leading cause of rail-related deaths in the US. Nationally, more than 430 trespass fatalities and nearly as many injuries occur each year. San Luis Obispo County is no exception. Over the past 10 years (2003-2012) there have been nine fatalities and 13 injuries in the County related to non-highway rail crossing trespassing. This exceeds the fatality and injury totals for all other rail accidents of three fatalities and three injuries. There was one additional trespassing incident in May 2013 which resulted in the death of an individual walking on the tracks near Highway 101 and Five Cities Drive in Pismo Beach.

4.7.1.4 Existing Rail Operations

Rail traffic on the UPRR Coast Line through San Luis Obispo County is relatively light. Currently, there are no more than 6 freight trains per day (Caltrans 2013) and six passenger trains daily. Freight trains travelling through San Luis Obispo County carry a variety of freight, including crude oil and hazardous materials. One crude oil unit train currently traverses the County traveling from San Ardo to Los Angeles. San Luis Obispo is served by Amtrak's Pacific Surfliner from San Luis Obispo to San Diego twice daily (four total trips) and the Coast Starlight from Seattle, Washington to Los Angeles, which stops twice daily (one in each direction). Average daily traffic south of the City of San Luis Obispo consists of 12 trains per day, while there are only eight trains per day north of San Luis Obispo.

Currently, the rail operations associated with the Phillips 66 Refinery consist of the export of petroleum coke from the SMR for commercial use throughout the U.S. and abroad. A train typically arrives every Wednesday and drops off 18 – 20 empty cars. After delivering the empty cars, the engine picks up any full cars and leaves the SMR (the engine operates for approximately a half hour on site). Each full car hauls approximately 100 tons. The delivered empty cars are filled with coke during the following week and moved around on site by the 'shuttlewagon.' The shuttlewagon, also referred to as a 'switching locomotive' is a small unit compared to an actual train locomotive. The shuttlewagon operates less than two hours per week. Fuel consumption is typically less than five gallons of diesel per week.

Table 4.7.10 Private At-Grade Rail Crossings

Number	Street	City	Devices	Latitude	Longitude
1	Private Road	Unincorporated	None	35.765	-120.697
2	Estrella Road	Unincorporated	None	35.744	-120.697
3	Private Road	Unincorporated	None	35.685	-120.695
4	Private Road	Unincorporated	None	35.679	-120.695
5	Rancho Del Salinas	Unincorporated	None	35.676	-120.694
6	Private Road	Unincorporated	Gates	35.654	-120.694
7[1]	**Ramada Dr**	**Paso Robles**	**None**	**35.599**	**-120.692**
8	Unnamed	Paso Robles	None	35.594	-120.693
9[2]	**Unnamed**	**Unincorporated**	**None**	**35.588**	**-120.692**
10	Volpi Ysabel Road	Unincorporated	None	35.581	-120.688
11	Marquita Avenue	Unincorporated	None	35.575	-120.689
12	Private	Unincorporated	None	35.567	-120.695
13	2nd Street Extension	Unincorporated	None	35.553	-120.699
14	8th Street Extension	Unincorporated	None	35.546	-120.706
15	Old County Rd	Unincorporated	None	35.541	-120.710
16	Hendrix	Unincorporated	None	35.536	-120.710
17	Private	Unincorporated	None	35.452	-120.619
18	Private	Unincorporated	None	35.437	-120.608
19	Kaiser Sand & Gravel	Unincorporated	Gates	35.419	-120.604
20	Conoco Philips	Unincorporated	None	35.406	-120.605
21	Santa Margarita Ranch	Unincorporated	None	35.397	-120.605
22	Private	Unincorporated	None	35.367	-120.640
23	UP Maintenance	Unincorporated	None	35.361	-120.637
24	Private	Unincorporated	None	35.351	-120.635
25	Private	Unincorporated	None	35.332	-120.645
26	UP Maintenance	Unincorporated	None	35.332	-120.647
27	UP Maintenance	Unincorporated	None	35.333	-120.648
28	Private	Unincorporated	None	35.341	-120.657
29	Private	Unincorporated	None	35.339	-120.660
30	Private	Unincorporated	None	35.332	-120.678
31	Private	Unincorporated	None	35.327	-120.689

Table 4.7.10 Private At-Grade Rail Crossings

Number	Street	City	Devices	Latitude	Longitude
32	Private	Unincorporated	None	35.313	-120.676
33	Hathaway/Calpoly	San Luis Obispo	Gates	35.298	-120.666
34	Private	Unincorporated	None	35.171	-120.623
35	Private	Unincorporated	None	35.165	-120.629
36	Big Bird	Unincorporated	None	35.149	-120.633
37[3]	**26th St Pvt**	**Unincorporated**	**None**	**35.090**	**-120.601**
38	Randy Ln	Unincorporated	None	35.063	-120.598
39	Union Oil Pvt[7]	Unincorporated	None	35.041	-120.595
40[4]	**Private Rd**	**Unincorporated**	**None**	**35.004**	**-120.575**
41[5,6]	**Private Rd**	**Unincorporated**	**None**	**34.983**	**-120.566**

1. On March 9, 2008 at 4:45 PM a passenger train traveling at a speed of approximately 48 mph struck a pickup crossing the tracks at a speed of approximately 20 mph. There were no injuries or fatalities.
2. On May 27, 2007 at 3:30 AM a freight train traveling at a speed of approximately 35 mph struck an automobile stopped on the crossing. There were no injuries or fatalities.
3. On February 14, 2003 at 7:20 AM a passenger train traveling at a speed of approximately 47 mph struck a truck stopped on the crossing. There were no injuries or fatalities.
4. On September 23, 2004 at 2:50 PM a freight train traveling at a speed of approximately 50 mph struck a vehicle described as "Other Motor Vehicle" that was crossing the tracks at approximately 10 mph resulting in one injury.
5. On May 22, 2004 at 8:15 AM a freight train traveling at a speed of approximately 40 mph struck a tractor-trailer that was crossing the tracks at approximately 5 mph resulting in one injury.
6. On April 18, 2012 at 4:16 PM by a passenger train traveling at a speed of approximately 70 mph struck an automobile stopped on the crossing resulting in two fatalities.
7. This crossing is located on the SMR property.

Note: There was one additional accident in 2008 at the Depot Avenue (Edna Valley) crossing where a passenger train travelling at 40 mph struck a pickup truck stopped on the tracks, resulting in one injury. This crossing has since been removed.

Figure 4.7-4 Private At-Grade Rail Crossings

4.7.1.5 Existing Refinery Operations

For the public safety analysis, the study area includes the existing facilities and pipelines, as well as the existing rail facilities. The existing sources of risks include current operations at the Refinery, truck transportation of hazardous materials, crude oil pipelines and current rail operations.

Santa Maria Refinery Risk of Upset

The Santa Maria Refinery processes crude oil and produced gas, both of which could present risks to the public. Crude oil is processed and then stored in tanks that could spill and ignite, creating thermal radiation impacts. Thermal radiation impacts from crude oil tank fires could cause injury 220 feet away. The closest population to the crude oil tanks at the Refinery is industrial area 425 feet northeast of the crude oil storage facilities. The closest residence to the crude oil tanks, which is located within the industrial area, is 1,200 feet northeast of the tank storage area. The gas processing equipment and piping are within the Refinery, at least 1,700 feet from the Refinery fence line and the closest receptor on industrial property. Given the limited population and significant distance between these receptors and the Refinery, there would not be a significant risk level.

A search of historical release data for the Refinery through the Federal Emergency Response Notification System indicates that in the last 28 years a total of 16 reportable releases occurred (from 1982 through 2010). Fifteen of these releases were associated with releases of excess gases to the emergency-only flare stack due to several equipment failures, including boiler and compressor failures. In 2004, a leaking crude oil pipeline caused a release.

Santa Maria Refinery Existing Transportation Risk

Transportation of Hazardous Materials on Roadways

Materials transported by truck and rail could cause impacts if those materials are spilled. Crude oil transported to the Santa Maria Pump Station, as well as sulfur and coke transported by truck and rail, would primarily cause environmental impacts in the immediate vicinity of the spill. Crude oil and solid sulfur are not acutely hazardous materials. Coke is not a hazardous material. If crude oil was spilled, fire could occur along the transportation route at the accident location. Given the properties of crude oil, the likelihood of an explosion is virtually non-existent and consequently explosion scenarios are not addressed further in this document. Fire thermal impacts would be limited to the immediately vicinity of the spill site. Risk levels would be minimal due to the properties of crude oil and impacts would be associated primarily with environmental issues.

Transportation of Hazardous Materials by Pipeline

Materials transported by pipeline could cause impacts if those materials are spilled. Crude oil transported from the Santa Maria Pump Station could cause primarily environmental issues in the immediate vicinity of the spill, which could include downstream areas if a spill drains into a creek area. Crude oil is not an acutely hazardous material. If crude oil was spilled, fire could occur along the transportation route at the accident location. Given the properties of crude oil, the likelihood of an explosion is virtually non-existent and consequently explosion scenarios are not addressed further in this document. Fire thermal impacts would be limited to the immediately

vicinity of the spill site. Risk levels would be minimal due to the properties of crude oil and impacts would be associated primarily with environmental issues.

Statistics on public safety impacts related to crude oil transportation suggest that the potential for injuries is low. The DOT Office of Pipeline Safety (OPS) database indicates there have been no fatalities, and nine out of 841 crude oil pipeline incidents led to injuries over a 14-year period in the United States, although none of these injuries were to the public. For the period pre-1985 (1968 to 1985) there were eight incidents that produced fatalities, and 12 incidents that produced injuries on crude oil pipelines, although none of these were impacts to the public. But the OPS database is unclear if these incidents occurred at or near other processing equipment (i.e., within a facility). The California State Fire Marshal's Hazardous Liquid Pipeline Risk Assessment report (CSFM 1993) indicates that over a 10 year period there have been no injuries or fatalities associated with crude oil pipeline spills in California. In general, unlike a gas release (which occurs much quicker), the lack of public impacts from crude oil spills is due to the possibility that most persons move out of the way of a spill and are not directly affected if it catches fire.

Santa Maria Pump Station to Refinery Pipeline

The pipeline between Santa Maria Pump Station and the SMR contains a manual check valve on the north side of the Santa Maria River, which would prevent the oil from flowing backwards along the downhill gradient from the Summit Pump Station in the event of a spill. The Santa Maria and Summit pump stations also have automatic valves.

Spill volumes are calculated based on the pipeline elevation profiles and previous environmental impact reports prepared for the pipeline (SBC 2001). Spill volumes could be as high as approximately 8,400 barrels between the Santa Maria Pump Station and the Summit Pump Station. The most sensitive area would be the Santa Maria River crossing and the Nipomo Creek corridor.

Refinery to Rodeo Pipeline

Spills associated with the Refinery to Rodeo pipeline would be a function of the pipeline size, flow rates, and the pipeline elevation profile.

Transportation Risk

The potential transportation risks associated with the SMR were evaluated in the Phillips SMR Throughput Increase Project FEIR and are summarized below.

- Accidents that generate spills of hazardous materials that could impact public receptors along roadways produce the risks associated with transportation. These risks are associated with the transportation of solid petroleum coke and recovered solidified sulfur.
- Products leave the SMR as solid petroleum coke by rail or haul truck and as recovered sulfur by haul truck as well as some hazardous wastes. The Rail Spur Project would not be expected to increase the production of coke and sulfur over what is allowed the Throughput Increase Project. Transportation of hazardous waste under the Rail Spur Project would be expected to be the same as the current operations.

- Petroleum coke is shipped via truck or railcar to customers as fuel or onto ships for export. Major petroleum coke destinations include Mojave, Victorville, Cupertino, Fontana, Lebec, and Gorman, and Long Beach for export.
- Sulfur is shipped via truck to customers in the agricultural industry or loaded on ships for export. All products are shipped outside of San Luis Obispo County. Sulfur truck destinations are in the San Joaquin Valley from Bakersfield to Fresno, as well as Long Beach for export.
- Pipeline transportation of crude oil presents a low risk to public health since crude oil spills generally do not catch fire and the public has sufficient time to move away from spills in the unlikely event of ignition. Generally, spills of crude oil produce environmental impacts as opposed to public safety impacts.
- Risk levels associated with transportation would be minimal due to the properties of crude oil, sulfur, and coke and impacts would primarily affect environmental resources.

Hazardous Materials Contamination and Transport

The Refinery must submit information on wastes generated, transported, or released offsite to the EPA as part of the Toxic Release Inventory Program and the Biennial Reporting System. Toxic Release Inventory reports indicate that the Refinery generates more than 155,000 pounds of waste annually; approximately 122,000 pounds are treated onsite, 300 pounds are recycled, 1,000 pounds are treated offsite, and 32,000 pounds are released (mostly into the air as sulfuric acid).

The Environmental Protection Agency has identified the Refinery as a "corrective action" site due to contamination. According to EPA Resource Conservation and Recovery Act reports, the site has human exposure "under control," but migration of contaminated groundwater is "not under control" (US EPA 2011b). Contacts with the RWQCB indicate that: 1) There has been regular groundwater monitoring at the site with the latest data from February, 2011; 2) Reports indicate low levels of TPH and metals; 3) The contaminated groundwater is associated with the coke piles; 4) DTSC is the lead agency on the coke pile clean up; and 5) RWQCB is the lead agency on the groundwater contamination (CSWRCB 2011).

Communication with the Regional EPA indicates that certification of the current status of the groundwater situation at the SMR has not been conducted in over 20 years and the status in terms of the level of control could not be verified through the EPA (communication with Kaplan by Applicant). As part of the responses to comments on the DEIR process, the RWQCB indicates that: "limited impacts to groundwater have been detected at the site during the past several years of groundwater monitoring, primarily due to low levels of metals and TPH that generally have not exceeded standards and do not appear to be migrating off site."

Phillips has been conducting groundwater monitoring at SMR under the regulatory authority of the RWQCB since 1994. In addition, Phillips conducted soil and groundwater assessments in 2001 at the request of the RWQCB of the coke piles, a former pond located in the coke piles, and the area around monitoring well BC-4 to evaluate whether the coke piles, the former coke pond, and a surface water runoff area near well BC-4 were impacting the underlying soil and groundwater. These studies indicated "slightly increased concentrations of metals in soil" but are relatively low and insignificant. Metals that are present in coke have been detected in

groundwater at concentrations above the California Department of Health maximum contamination levels (MCL) in the area around the coke pile runoff area due to reduced pH levels (acidic) associated with the periodically saturated conditions in the runoff area. TPH was detected in the coke and process water samples and several groundwater samples. The concentrations of TPH were below 1,000 ppm in all samples, and the samples with elevated levels were determined to be naturally occurring organic materials (non-hydrocarbon based) by utilizing a silica-gel sampling technique (Secor 2001). These levels are below the RWQCB action levels.

The Biennial Reporting System database contains data on the generation, shipment, and receipt of hazardous waste (US EPA 2011a). The SMR generated and shipped offsite approximately 46 tons of hazardous wastes annually, which is summarized in Table 4.7.11. Refinery-generated waste is shipped to several nearby facilities.

Table 4.7.11 Hazardous Wastes Generated by the SMR

Material	Annual Amount, tons	Destination City, State
Activated Carbon	2.98	Veolia, Azusa, CA
Misc Debris	0.11	Veolia, Azusa, CA
Aqueous Waste from lab	2.25	Veolia, Azusa, CA
Oily Water Sewer Debris	37.17	Aragonite, UT
Paint Slops	0.90	Veolia, Azusa, CA
Refinery Sludge	0.75	Veolia, Azusa, CA
CEM Lead Acetate Tape	0.03	Veolia, Azusa, CA
Parts Washer Solvent	1.70	Safety-Kleen, Santa Ana, CA
Lead contaminated Material	0.10	Veolia, Azusa, CA

Source: Biennial Reporting System database search 2007 (most recent available)

Veolia ES Technical Solutions

Veolia ES Technical Solutions is a 7-acre, solvent recycling and resource recovery facility at 1704 West First Street in Azusa, California. The Veolia facility receives hazardous waste, including benzenes, dioxins, heavy metals, and other toxic organics and inorganics. The facility recycles used solvents, distributes new solvents, and blends used solvents and oils to produce fuel substitutes. Wastes are accepted in bulk and in drums. Veolia restricts the acceptance of dioxins, polychlorinated biphenyls, radioactive wastes, reactive wastes, biological wastes and infectious materials (CDTSC 2011). The process equipment for solvent reclamation includes two distillation units and a thin film evaporator. In 2009, total waste disposal in the landfill was 27,738 tons.

Veolia primarily serves paint and electronics companies, the aerospace industry, printers, and manufacturers in Los Angeles and Orange counties. A Part B permit was issued to this facility in August of 1983. Veolia's EPA ID is CAD008302903.

The Safety-Kleen Santa Ana

The Safety-Kleen Santa Ana facility has operated 2120 South Yale Street in Santa Ana, California, since the 1970s. The facility is within an industrial/commercial zoned area. The Safety-Kleen Santa Ana facility bulks and stores containers of hazardous wastes until it

accumulates large enough quantities to cost effectively transport the waste to an authorized treatment, recycling, or disposal facility. Hazardous waste is not treated or disposed of at this location. In 2007, total waste disposal was 1,419 tons. The facility Spent Solvent Tank has a capacity of 12,000 gallon and the Container Storage Area has a capacity of 18,500 gallons. Safety-Kleen Santa Ana's EPA ID is CAT000613976 (CDTSC 2011).

The Aragonite Facility
The Aragonite Facility is a commercial incinerator, transfer, and storage facility in a remote area of Tooele County, Utah, approximately 2.5 miles south of Interstate 80. It was formerly known as Safety-Kleen (Aragonite) Inc., Laidlaw Environmental Services (Aragonite), Inc. and Aptus, Inc. The incinerator is a 140- million-British-thermal-unit slagging rotary kiln with a vertical afterburner chamber. The gas cleaning train consists of a spray dryer, baghouse, saturator, wet scrubber, and wet electrostatic precipitator. Permitted waste storage areas include a bulk liquid tank farm (16 approximately 30,000-gallon tanks); drum storage buildings (approximately 10,000-drum capacity); sludge storage tanks (approximately 38,000-gallon total capacity); and bulk solids storage tanks (approximately 1100-cubic-yard total capacity).

The facility handles hazardous wastes, polychlorinated biphenyls, industrial wastes, and other non-hazardous wastes. The facility is designed to handle high and low British thermal unit liquid wastes, sludges, bulk solids, and containerized wastes. The current permitted capacity of the incinerator is approximately 13 tons per hour. It typically processes approximately 50,000 tons per year, operating 24 hours per day (UDEQ 2011).

4.7.2 Regulatory Setting

Many regulations and standards exist to ensure the safe operation of oil facilities, pipelines, and hazardous materials. This section provides an overview of the federal, state, and local regulations.

4.7.2.1 Federal Laws and Regulations

Federal laws address gas and liquid pipelines and oil facilities.

Liquid Pipelines and Oil Facilities
Hazardous liquid pipelines are under the jurisdiction of the DOT and must follow the regulations in 49 CFR Part 195, Transportation of Hazardous Liquids by Pipeline, as authorized by the Hazardous Liquid Pipeline Safety Act of 1979 (49 USC 2004). Other applicable Federal requirements are contained in 40 CFR Parts 109, 110, 112, 113, and 114, pertaining to the need for Oil Spill Prevention Control & Countermeasures Plans; 40 CFR Parts 109–114 promulgated in response to the Oil Pollution Act of 1990.

Overview of the 49 CFR 195 Requirements.
Part 195.30 incorporates many of the applicable national safety standards of the:

- American Petroleum Institute (API);
- American Society of Mechanical Engineers (ASME);

- American National Standards Institute (ANSI); and
- American Society for Testing and Materials (ASTM).

Part 195.50 requires reporting of accidents by telephone and in writing for:

- Explosion or fire not intentionally set by the operator;
- Spills of 5 gallons or more or 5 barrels if confined to company property and cleaned up promptly;
- Daily loss of 5 barrels a day to the atmosphere;
- Death or injury necessitating hospitalization; or
- Estimated property damage, including cleanup costs, greater than $50,000.

The Part 195.100 series includes design requirements for the temperature environment, variations in pressure, internal design pressure for pipe specifications, external pressure and external loads, new and used pipe, valves, fittings, and flanges.

The Part 195.200 series provides construction requirements for standards such as compliance, inspections, welding, siting and routing, bending, welding and welders, inspection and nondestructive testing of welds, external corrosion and cathodic protection, installing in-ditch and covering, clearances and crossings, valves, pumping, breakout tanks, and construction records.

The Part 195.300 series prescribes minimum requirements for hydrostatic testing, compliance dates, test pressures and duration, test medium, and records.

The Part 195.400 series specifies minimum requirements for operating and maintaining steel pipeline systems, including:

- Correction of unsafe conditions within a reasonable time;
- Procedural manual for operations, maintenance, and emergencies;
- Training;
- Maps;
- Maximum operating pressure;
- Communication system;
- Cathodic protection system;
- External and internal corrosion control;
- Valve maintenance;
- Pipeline repairs;
- Overpressure safety devices;

- Firefighting equipment; and
- Public education program for hazardous liquid pipeline emergencies and reporting.

Overview of 40 CFR Parts 109, 110, 112, 113, and 114
The SPCCs covered in these regulatory programs apply to oil storage and transportation facilities and terminals, tank farms, bulk plants, oil refineries, and production facilities, as well as bulk oil consumers, such as apartment houses, office buildings, schools, hospitals, farms, and state and federal facilities as follows:

- Part 109 establishes the minimum criteria for developing oil-removal contingency plans for certain inland navigable waters by state, local, and regional agencies in consultation with the regulated community (i.e., oil facilities).
- Part 110 prohibits discharge of oil such that applicable water quality standards would be violated, or that would cause a film or sheen upon or in the water. These regulations were updated in 1987 to adequately reflect the intent of Congress in Section 311(b) (3) and (4) of the Clean Water Act, specifically incorporating the provision "in such quantities as may be harmful."
- Part 112 deals with oil spill prevention and preparation of Spill Prevention Control and Countermeasure Plans. These regulations establish procedures, methods, and equipment requirements to prevent the discharge of oil from onshore and offshore facilities into or upon the navigable waters of the United States. These regulations apply only to non-transportation-related facilities.
- Part 113 establishes financial liability limits; however, these limits were preempted by the Oil Pollution Act of 1990.
- Part 114 provides civil penalties for violations of the oil spill regulations.

Overview of 6 CFR Part 27
Chemical Facility Anti-Terrorism Standards, 6 CFR 27. The Federal Department of Homeland Security established the chemical facility anti-terrorism standards of 2007. This 2007 rule established risk-based performance standards for the security of chemical facilities. It requires covered chemical facilities to prepare Security Vulnerability Assessments, which identify facility security vulnerabilities, and to develop and implement Site Security Plans, which include measures that satisfy the identified risk-based performance standards.

Hazardous Waste Handling Requirements

Resource Conservation and Recovery Act and Associated Hazardous and Solid Waste Amendments, 40 CFR 260
Implementation of Resource Conservation and Recovery Act (RCRA) resulted in the creation of a major federal hazardous waste regulatory program that is administered by the EPA. Under RCRA, the EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA was amended by the Associated Hazardous and Solid Waste Amendments (HSWA), which affirmed and extended the concept of regulating hazardous wastes from generation through disposal. HSWA specifically prohibits the use of certain techniques for the disposal of some hazardous wastes. Under RCRA, individual states may implement their own

hazardous waste programs instead of RCRA, as long as the state program is at least as stringent as the Federal RCRA requirements. The EPA approved California's program to implement Federal hazardous waste regulations on August 1, 1992.

Asbestos and Lead

National Emissions Standards for Hazardous Air Pollutants, 40 CFR 61 Subpart M
Under Subpart M, an asbestos containing materials survey must be performed prior to renovation or demolition activities. Notification to the lead agency is required 10 working days prior to the start of work (disturbance of asbestos containing materials). Additional federal- and state-level asbestos requirements related to OSHA standards in 29 CFR 1926.1101 are covered by the Asbestos Construction Standard, Title 8, CCR Section 1529, which is described separately below.

The Worker Protection Rule (40 CFR 763, Subpart G, and 29 CFR 1910.1001) provides worker protection measures through engineering controls, worker training, labeling, respiratory protection, and waste management; the rule also defines asbestos containing materials and sets the permissible exposure level for asbestos.

Emergency Planning and Community Right-to-Know Act
Under the Emergency Planning and Community Right-to-Know Act, or Title III of the Superfund Amendments and Reauthorization Act of 1986, the EPA requires local agencies to regulate the storage and handling of hazardous materials and requires development of a plan to mitigate the release of hazardous materials. Businesses that handle any of the specified hazardous materials must submit to government agencies (i.e., fire departments or Public Health Departments), an inventory of the hazardous materials, an emergency response plan, and an employee training program. The business plans must provide a description of the types of hazardous materials/waste onsite and the location of these materials. The information in the business plan can then be used in the event of an emergency to determine the appropriate response action, the need for public notification, and the need for evacuation.

In 1990, Congress passed the Pollution Prevention Act which requires facilities to report additional data on waste management and source reduction activities to EPA under Toxics Release Inventory Program. The goal of the Toxics Release Inventory is to provide communities with information about toxic chemical releases and waste management activities and to support informed decision making at all levels by industry, government, non-governmental organizations, and the public.

Hazardous Materials Management Planning

Section 112(r) of the Clean Air Act Amendments of 1990, 40 CFR 68
The EPA requires facilities that handle listed regulated substances to develop Risk Management Programs (RMP) to prevent accidental releases of these substances. RMP materials are submitted to both local agencies (generally the fire department) and the Federal EPA. Stationary sources with more than a threshold quantity of a regulated substance shall be evaluated to determine the potential for, and impacts of, accidental releases of that substance. Under certain conditions, the owner or operator of a stationary source may be required to develop and submit a Risk Management Program. Risk Management Programs consist of three main elements: a hazard

assessment that includes off site consequences analyses and a five-year accident history; a prevention program; and an emergency response program.

National Contingency Plan Requirements

Spill Prevention Control and Countermeasures Plans, 40 CFR 112.3 and 112.7
Facilities that store large volumes of hazardous materials are required to have a Spill Prevention Control and Countermeasures Plans (SPCCP) per the requirements of 40 CFR 112 submitted to the EPA. The SPCCP is designed to prevent spills from onsite facilities and includes requirements for secondary containment, provides emergency response procedures, and establishes training requirements.

Hazardous Materials Transportation

The Hazardous Materials Transportation Act, 49 CFR 171, Subchapter C
The DOT, Federal Highway Administration, and the Federal Railroad Administration regulate transportation of hazardous materials at the Federal level (state requirements are discussed in following sections). The Hazardous Materials Transportation Act requires that carriers report accidental releases of hazardous materials to DOT at the earliest practical moment. Other incidents that must be reported include deaths, injuries requiring hospitalization, and property damage exceeding $50,000.

Worker Health and Safety

Occupational Safety and Health Act, 29 CFR et seq.
Under the authority of the Occupational Safety and Health Act of 1970, the federal OSHA has adopted numerous regulations pertaining to worker safety (29 CFR) and provides oversight and enforcement (along with CalOSHA in California). These regulations set standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries. Some OSHA regulations contain standards relating to hazardous materials handling, including workplace conditions, employee protection requirements, first aid, and fire protection, as well as material handling and storage.

Hazard Communication, 29 CFR 1910.1200
The purpose of the OSHA Hazard Communication law is to ensure that the hazards of all chemicals produced or imported are evaluated, and that information concerning any potential hazards is transmitted to employers and employees. This transmittal of information is to be accomplished by means of comprehensive hazard communication programs, which are to include container labeling and other forms of warning, material safety data sheets, and employee training.

Process Safety Management, 29 CFR 1910.119
Under this section, facilities that use, store, manufacture, handle, process, or move hazardous materials are required to:

- Conduct employee safety training;
- Have an inventory of safety equipment relevant to potential hazards;
- Have knowledge on use of the safety equipment;

- Prepare an illness prevention program;
- Provide hazardous substance exposure warnings;
- Prepare an emergency response plan; and
- Prepare a fire prevention plan.

In addition, 29 CFR 1910.119, Process Safety Management of Highly Hazardous Chemicals, OSHA specifically requires prevention program elements to protect workers at facilities that have toxic, flammable, reactive or explosive materials. Prevention program elements are aimed at preventing or minimizing the consequences of catastrophic releases of chemicals and include process hazard analyses, formal training programs for employees and contractors, investigation of equipment mechanical integrity, and an emergency response plan.

4.7.2.2 California Laws and Regulations

State laws address gas and liquid pipelines, oil and gas facilities and hazardous materials and waste. The following sections discuss each of these.

California Public Utilities Commission (CPUC)
The CPUC has an extensive rail safety program to address both passenger and freight rail safety:

State Constitution, Article XII, Sec. 4	The commission may fix rates and establish rules for the transportation of passengers and property by transportation companies ….
PU Code Sec. 309.7 (a)	(a) The division of the commission responsible for consumer protection and safety shall be responsible for inspection, surveillance, and investigation of the rights-of-way, facilities, equipment, and operations of railroads and public mass transit guideways, and for enforcing state and federal laws, regulations, orders, and directives relating to transportation of persons or commodities, or both, of any nature or description by rail. The consumer protection and safety division shall advise the commission on all matters relating to rail safety, and shall propose to the commission rules, regulations, orders, and other measures necessary to reduce the dangers caused by unsafe conditions on the railroads of the state.
PU Code Sec. 309.7 (b)	(b) In performing its duties, the consumer protection and safety division shall exercise all powers of investigation granted to the commission, including rights to enter upon land or facilities, inspect books and records, and compel testimony. The commission shall employ sufficient federally certified inspectors to ensure at the time of inspection that railroad locomotives and equipment and facilities located in class I railroad yards in California are inspected not less frequently than every 180 days, and all main and branch line tracks are inspected not less frequently than every 12 months.
PU Code Sec. 309.7 (c)	(c) The general counsel shall assign to the consumer protection and safety division the personnel and attorneys necessary …to enforce safety laws, rules, regulations, and orders, and to collect fines and penalties resulting from the violation of any safety rule or regulation.
PU Code Sec. 309.7 (d)	(d) The activities of the consumer protection and safety division that relate to safe operation of common carriers by rail, other than those relating to grade crossing protection, shall also be supported by the fees paid by railroad corporations.

PU Code Sec. 315

315. The commission shall investigate the cause of all accidents occurring within this State upon the property of any public utility or directly or indirectly arising from or connected with its maintenance or operation, resulting in loss of life or injury to person or property and requiring, in the judgment of the commission, investigation by it, and may make such order or recommendation with respect thereto as in its judgment seems just and reasonable.

PU Code Sec. 765.5

(a) The purpose of this section is to provide that the commission takes all appropriate action necessary to ensure the safe operation of railroads in this state.

(b) The commission shall dedicate sufficient resources necessary to adequately carry out the State Participation Program for the regulation of rail transportation of hazardous materials as authorized by the Hazardous Material Transportation Uniform Safety Act of 1990 (P.L. 101-615).

(c) On or before July 1, 1992, the commission shall hire a minimum of six additional rail inspectors who are or shall become federally certified, consisting of three additional motive power and equipment inspectors, two signal inspectors, and one operating practices inspector, for the purpose of enforcing compliance by railroads operating in this state with state and federal safety regulations.

(d) On or before July 1, 1992, the commission shall establish, by regulation, a minimum inspection standard to ensure, at the time of inspection, that railroad locomotives, equipment, and facilities located in class I railroad yards in California will be inspected not less frequently than every 120 days, and inspection of all branch and main line track not less frequently than every 12 months.

(e) Commencing July 1, 2008, in addition to the minimum inspections undertaken pursuant to subdivision (d), the commission shall conduct focused inspections of railroad yards and track, either in coordination with the Federal Railroad Administration, or as the commission determines to be necessary. The focused inspection program shall target railroad yards and track that pose the greatest safety risk, based on inspection data, accident history, and rail traffic density.

PU Code Sec. 768

768. The commission may, after a hearing, require every public utility to construct, maintain, and operate its line, plant, system, equipment, apparatus, tracks, and premises in a manner so as to promote and safeguard the health and safety of its employees, passengers, customers, and the public. The commission may prescribe, among other things, the installation, use, maintenance, and operation of appropriate safety or other devices or appliances, including interlocking and other protective devices at grade crossings or junctions and block or other systems of signaling. The commission may establish uniform or other standards of construction and equipment, and require the performance of any other act which the health or safety of its employees, passengers, customers, or the public may demand.

PU Code Sec. 7661

The consumer protection and safety division shall investigate any incident that results in a notification…and shall report its findings concerning the cause or causes to the commission.

PU Code Sec. 7662

Requires a railroad to place appropriate signage to notify an engineer of an approaching grade crossing and establishes standards for the posting of signage and flags, milepost markers, and permanent speed signs.

PU Code Sec. 7665.2

By July 1, 2007, requires every operator of rail facilities to provide a risk assessment to the commission and the agency for each rail facility in the state that is under its ownership, operation, or control, and prescribes the elements of the risk assessment.

PU Code Sec 7665.4	(f) Requires the rail operators to develop an infrastructure protection program, and requires the CPUC to review the infrastructure protection program submitted by a rail operator. Permits the CPUC to conduct inspections to facilitate the review, and permits the CPUC to order a rail operator to improve, modify, or change its program to comply with the requirements of this article. (g) Permits the CPUC to fine a rail operator for failure to comply with the requirements of this section or an order of the commission pursuant to this section.
General Order 22-B	Requires accident investigations on all incidents occurring on railroad property.
General Order 26-D	Establishes minimum clearances between railroad tracks, parallel tracks, side clearances, overhead clearances, freight car clearances, and clearances for obstructions, motor vehicles, and warning devices to prevent injuries and fatalities to rail employees by providing a minimum standards for overhead and side clearance on the railroad tracks. (Pursuant to PUC Sec. 768.)
General Order 72-B	Formulates uniform standards for grade crossing construction to increase public safety. (Pursuant to PUC Sec. 768.)
General Order 75-D	Establishes uniform standards for warning devices for at-grade crossings to reduce hazards associated with persons traversing at- grade crossings. (Pursuant to PUC Sec. 768.)
General Order 118-A	Provides standards for the construction, reconstruction, and maintenance of walkways adjacent to railroad tracks to provide a safe area for train crews to work. (Pursuant to PUC Sec. 768.)
General Order 126	Establishes requirements for the contents of First-Aid kits provided by common carrier railroads. (Pursuant to PUC Sec. 768.)
General Order 161	Establishes safety standards for the rail transportation of hazardous materials. (Pursuant to PUC Sec. 768.)
General Order 135	Establishes regulations governing the occupancy of public grade crossings by railroads. (Pursuant to PUC Sec. 768.)

California Health and Safety Code

- Division 20, Chapter 6.5, §25100-25249, Hazardous Waste Control (administered by the CalEPA and the California Department of Toxic Substances Control);
- Division 20, Chapter 6.95, §255500, et seq. Hazardous Materials Management Plan and Community Right-to-Know and Hazardous Materials Release Response Plans and Inventory (Business Plan Program, administered by local fire departments and the Certified Unified Program Agencies [CUPA]);
- Proposition 65 Compliance, H&SC §25249.5 et seq., administer by the CARB and the local APCD;
- H&SC §§25340-25392, Carpenter-Presley-Tanner Hazardous Substance Account Act (administered by the CalEPA and the California Department of Toxic Substances Control); and

- H&SC §§25531-255413, California Accidental Release Prevention Program, administered by local fire departments and the CUPA.

California Water Code

Division 7, Water Quality (Porter-Cologne Water Quality Control Act), administered by the State Water Resources Control Board.

California Code of Regulations

- Title 8, §5189 and §5192, Accidental Release Plan administered by local fire departments and the Certified Unified Program Agencies (CUPA);
- Title 14, Division 2, Department of Conservation, administered by DOGGR;
- Title 19, §2729, Employee Training Program, administered by the California Office of Emergency Services and local fire departments and departments of public health;
- Title 22, Division 4, Chapter 30, Hazardous Wastes (administered by the CalEPA and the California Department of Toxic Substances Control);
- Title 22, Division 4.5, §§66260-67786, Hazardous Waste Requirements (administered by the CalEPA and the California Department of Toxic Substances Control); and
- Title 22, §66265.50-.56, Contingency/Emergency Response Plan administered by local fire departments and the Certified Unified Program Agencies (CUPA).

Gas and Liquid Pipelines and Oil Facilities

Overview of California Pipeline Safety Regulations

State of California regulations Part 51010 through 51018 of the Government Code provide specific safety requirements that are more stringent than the Federal rules. These include:

- Periodic hydrostatic testing of pipelines, with specific accuracy requirements on leak rate determination;
- Hydrostatic testing by state-certified independent pipeline testing firms;
- Pipeline leak detection; and
- Reporting of all leaks required.

Recent amendments require pipelines to include means of leak prevention and cathodic protection, with acceptability to be determined by the California State Fire Marshall (CSFM). All new pipelines must also be designed to accommodate passage of instrumented inspection devices (smart pigs) through the pipeline.

California Pipeline Safety Act of 1981

The California Pipeline Safety Act gives regulatory jurisdiction for the safety of all intrastate hazardous liquid pipelines and all interstate pipelines used for the transportation of hazardous or highly volatile liquid substances to the CSFM. The law establishes the governing rules for interstate pipelines to be the Federal Hazardous Liquid Pipeline Safety Act and Federal pipeline safety regulations.

Oil Pipeline Environmental Responsibility Act (Assembly Bill 1868)
This Act requires every pipeline corporation qualifying as a public utility and transporting crude oil in a public utility oil pipeline system to be held strictly liable for any damages incurred by "any injured party which arise out of, or are caused by, the discharge or leaking of crude oil or any fraction thereof ...." The law applies only to public utility pipelines for which construction would be completed after January 1, 1996, or that part of an existing utility pipeline that is being relocated after the above date and is more than three miles in length. The major features signed into law in October 1995 include:

- Each pipeline corporation that qualifies as a public utility that transports any crude oil in a public utility oil pipeline system shall be absolutely liable, without regard to fault, for any damages incurred by any injured party that arise out of, or are caused by, the discharge or leaking of crude oil.
- Damages for which a pipeline corporation is liable under this law are: all costs of response, containment, cleanup, removal, and treatment, including monitoring and administration cost; injury or economic losses resulting from destruction of, or injury to, real or personal property; injury to, destruction of, or loss of natural resources, including but not limited to, the reasonable cost of rehabilitating wildlife habitat, and other resources and the reasonable cost of assessing that injury, destruction, or loss, in any action brought by the State, County, city, or district; loss of taxes, royalties, rents, use, or profit shares caused by the injury, destruction, loss, or impairment of use of real property, personal property, or natural resources; and loss of use and enjoyment of natural resources and other public resources or facilities in any action brought by the State, County, city, or district;
- A pipeline corporation shall immediately clean up all crude oil that leaks or is discharged from a pipeline.
- No pipeline system subject to this law shall be permitted to operate unless the State Fire Marshal certifies that the pipeline corporation demonstrates sufficient financial responsibility to respond to the liability imposed by this section. The minimum financial responsibility required by the State Fire Marshal shall be seven hundred fifty dollars ($750) times the maximum capacity of the pipeline in the number of barrels per day up to a maximum of one hundred million dollars ($100,000,000) per pipeline system, or a maximum of two hundred million dollars ($200,000,000) per multiple pipeline system. For the Pacific Pipeline, the Bill specifically requires $100,000,000 for the financial responsibility (Section l.h.(l)).
- Financial responsibility shall be demonstrated by evidence that is substantially equivalent to that required by regulations issued under Section 8670.37.54 of the Government Code, including insurance, surety bond, letter of credit, guaranty, qualification as a self-insurer, or combination thereof or any other evidence of financial responsibility. The State Fire Marshal shall require that the documentation evidencing financial responsibility be placed on file with that office.
- The State Fire Marshal shall require evidence of financial responsibility to fund post-closure cleanup spots. The evidence of financial responsibility shall be 15 percent of the amount of financial responsibility stated above.

California Accident Release Prevention
The California Accident Release Prevention program mirrors the Federal Risk Management program, except that it adds external events and seismic analysis to the requirements and includes facilities with lower inventories of materials. A California Accident Release Prevention or Risk Management Plan, as administered by the Fire Departments and the EPA, if applicable, is a document prepared by the owner or operator of a stationary source containing detailed information including:

- Regulated substances held onsite at the stationary source;
- Offsite consequences of an accidental release of a regulated substance;
- The accident history at the stationary source;
- The emergency response program for the stationary source;
- Coordination with local emergency responders;
- Hazard review or process hazard analysis;
- Operating procedures at the stationary source;
- Training of the stationary source's personnel;
- Maintenance and mechanical integrity of the stationary source's physical plant; and
- Incident investigation.

Hazardous Materials and Hazardous Waste

Hazardous Waste Control Law
The Hazardous Waste Control Law is administered by the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). DTSC has adopted extensive regulations governing the generation, transportation, and disposal of hazardous wastes. These regulations impose cradle-to-grave requirements for handling hazardous wastes in a manner that protects human health and the environment. The Hazardous Waste Control Law regulations establish requirements for identifying, packaging, and labeling hazardous wastes. They prescribe management practices for hazardous wastes; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. Hazardous waste is tracked from the point of generation to the point of disposal or treatment using hazardous waste manifests. The manifests list a description of the waste, its intended destination, and regulatory information about the waste.

Hazardous Materials Management Planning
The Office of Emergency Services, in support of local government, coordinates overall state agency response to major disasters. The office is responsible for assuring the State's readiness to respond to and recover from natural, manmade, and war-caused emergencies, and for assisting local governments in their emergency preparedness, response, and recovery efforts. During major emergencies, Office of Emergency Services may call upon all State agencies to help provide support. Due to their expertise, the California National Guard, California Highway Patrol (CHP), Department of Forestry and Fire Protection, Conservation Corps, Department of

Social Services, and Caltrans are the agencies most often asked to respond and assist in emergency response activities.

Hazardous Materials Transportation in California
California regulates the transportation of hazardous waste originating or passing through the State in Title 13 of the California Code of Regulations. The CHP and Caltrans have primary responsibility for enforcing Federal and State regulations and responding to hazardous materials transportation emergencies. The CHP enforces materials and hazardous waste labeling and packing regulations that prevent leakage and spills of material in transit and provide detailed information to cleanup crews in the event of an incident. Vehicle and equipment inspection, shipment preparation, container identification, and shipping documentation are all part of the responsibility of the CHP. The CHP conducts regular inspections of licensed transporters to ensure regulatory compliance. Caltrans has emergency chemical spill identification teams at locations throughout the State.

Hazardous waste must be regularly removed from generating sites by licensed hazardous waste transporters. Transported materials must be accompanied by hazardous waste manifests.

Hazardous Material Worker Safety, California Occupational Safety and Health Act
The California Occupational Safety and Health Administration (Cal/OSHA) is responsible for assuring worker safety in the handling and use of chemicals in the workplace. Cal/OSHA assumes primary responsibility for developing and enforcing workplace safety regulations in Title 8 CCR. Cal/OSHA hazardous materials regulations include requirements for safety training, availability of safety equipment, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.

Cal/OSHA also enforces hazard communication program regulations, which contain training and information requirements, including procedures for identifying and labeling hazardous substances. The hazard communication program also requires that Material Safety Data Sheets be available to employees and that employee information and training programs be documented.

County of San Luis Obispo Regulations

Energy Element and Conservation and Open Space Element
In 1995, the County of San Luis Obispo adopted the Energy Element as part of the County's General Plan, subsequently merged with the Conservation and Open Space Element. The Conservation and Open Space Element contains a goal of protecting public health, safety, and environment and several policies that promote the stated goal. The applicable policies include:

- Policy 56. Encourage existing and proposed facilities to focus on measures and procedures that prevent oil, gas, and other toxic releases into the environment. This policy is to ensure that facilities: (1) take measures to prevent releases and spills; (2) prepare for responding to a spill or release; and (3) provide for the protection of sensitive resources. A review of a facilities spill response plan, or reports from other agencies, should be completed to monitor compliance.
- Policy 64. Guideline 64.1. To reduce the possibility of injury to the public, facility employees, or the environment, the applicant shall submit an emergency response plan which

details response procedures for incidents that may affect human health and safety or the environment. The plan shall be based on the results of the comprehensive risk analysis. In the case of a facility modification, the existing response plan shall be evaluated by the safety review committee and revisions made as recommended.

- Flammable and Combustible Liquid Storage. County Coastal Zone Land Use Ordinance Section 23.06.126 includes requirements for flammable and combustible liquid storage relating to: applicability, permit requirements, limitation on use, limitation on quantity, setbacks, and including California Department of Forestry and Fire Prevention (CAL FIRE) recommendations, as applicable. Without approval through a Development Plan, aboveground storage limits of combustible liquid is 20,000 gallons and 2,000 gallons for flammable liquids.

4.7.2.3 Other Applicable Guidelines, National Codes, and Standards

Safety and Corrosion Prevention Requirements — American Society of Mechanical Engineers, National Association of Corrosion Engineers, American National Standards Institute, API

The following design requirements are generally enforced by local building departments, fire departments and public health departments during plan review and permit issuance. The code requirements address a range of issues that would reduce impacts, including equipment design, material selection, and use of safety valves.

- ASME & ANSI B16.1 Cast Iron Pipe Flanges and Flanged Fittings;
- ASME & ANSI B16.9, Factory-Made Wrought Steel Butt Welding Fittings;
- ASME & ANSI B31.1a, Power Piping;
- ASME & ANSI B31.4a, addenda to ASME B31.4a, Liquid Transportation Systems for Hydrocarbons, Liquid Petroleum Gas, Anhydrous Ammonia, and Alcohols;
- NACE Standard RP0190, Item No. 53071. Standard Recommended Practice External Protective Coatings for Joints, Fittings, and Valves on Metallic Underground or Submerged Pipelines and Piping Systems;
- NACE Standard RP0169, Item No. 53002. Standard Recommended Practice Control of External Corrosion on Underground or Submerged Metallic Piping Systems;
- API 510 Pressure Vessel inspection Code;
- API 570 Piping Inspection Code, applies to in-service metallic piping systems used for the transport of petroleum products;
- API 572 Inspection of Pressure Vessels;
- API 574 Inspection Practices for Pipe System Components;
- API 575 API Guidelines and Methods for Inspection of Existing Atmospheric and Low-pressure Storage Tanks;
- API 576 Inspection of Pressure Relieving Devices;

- API 650 Welded Steel Tanks for Oil Storage;
- API 651 Cathodic Protection of Aboveground Storage Tanks;
- API 653 Tank Inspection, Repair, Alteration, and Reconstruction;
- API 2610, Design, Construction, Operation, Maintenance, and Inspection of Terminal & Tank Facilities; and
- API Spec 12B - Bolted Tanks for Storage of Production Liquids.

API 653, atmospheric tank inspection and repair, is particularly applicable to the Rail Spur Project and addresses the following issues:

- Tank suitability for service;
- Brittle fracture considerations;
- Inspections;
- Materials;
- Design considerations;
- Tank repair and alteration;
- Dismantling and reconstruction;
- Welding;
- Examination and testing;
- Marking and recordkeeping;
- Pertinent issues related to tank inspections in API 653;
- External inspections by an authorized inspector every 5 years;
- Ultrasonic inspections of shell thickness every 5 years (when corrosion rate not known); and
- Internal bottom inspection every 10 years, if corrosion rates not known.

Fire and Explosion Prevention and Control, National Fire Protection Agency
The following design requirements are generally enforced by fire departments during plan review and permit issuance. The code requirements address a range of issues that would reduce impacts, including fire fighting system design, and water supply requirements.

- NFPA 30 Flammable and Combustible Liquids Code and Handbook;
- NFPA 11 Foam Extinguishing Systems;
- NFPA 12 A&B Halogenated Extinguishing Agent Systems;
- NFPA 15 Water Spray Fixed Systems;
- NFPA 20 Centrifugal Fire Pumps; and
- NFPA 70 National Electrical Code.

4.7.3 Significance Criteria

As defined in Appendix G (the Environmental Checklist Form) of the California Environmental Quality Act (CEQA), a significant safety effect is one in which the Proposed Project "create[s] a potential health hazard or involve[s] the use, production or disposal of materials which pose a hazard to people, animal or plant populations in the area affected." The San Luis Obispo County Initial Study Checklist defines significant risk if the project will "result in a risk of explosion or release of hazardous substances (e.g. oil, pesticides, chemicals, radiation) or exposure of people to hazardous substances," or "create any other health hazard or potential hazard."

San Luis Obispo County does not have a process to address risk of upset and CEQA thresholds. Therefore, the Santa Barbara County thresholds have been applied. Santa Barbara County established a quantitative, risk-based criteria that has been utilized by various state agencies, including the California Coastal Commission and the California State Lands Commission. Santa Barbara County adopted Public Safety Thresholds in August 1999. The thresholds provide specific zones (i.e., green, amber, and red) on a risk profile curve to guide the determination of significance or insignificance based on the estimated probability and consequence of an accident. In general, risk levels in the green area would be less than significant and therefore acceptable, while risk levels in the amber and red zones would be significant. Risk profiles plot the frequency of an event against the consequence in terms of fatalities or injuries; frequent events with high consequence have the highest risk level.

The criteria used in this section are based on the potential risk associated with the facilities. Therefore, an impact would be considered significant if any of the following were to occur:

- Be within the amber or red regions of the Santa Barbara County Safety Criteria; or
- Non-compliance with any applicable design code, regulation, NFPA standard, or generally acceptable industry practice.

Issues related to fire protection and emergency response are discussed in Section 4.11, Public Services.

The foregoing thresholds do not address risk of environmental damage. The threshold applied for risk of significant environmental impact due to accidental spills is as follows: an impact of spills would be potentially significant if operations would increase the probability or volume of oil spills into the environment.

In addition, the thresholds do not apply to occupational safety. Occupational risk, which is governed by state and federal OSHAs is considered to be more voluntary and is generally judged according to more lenient standards of significance than those used for involuntary exposure.

A significant impact associated with existing site contamination and hazardous waste would be determined if the project would:

- Result in mobilization of contaminants currently existing in the soil and groundwater, creating potential pathways of exposure to humans or other sensitive receptors that would result in exposure to contaminant levels that would be expected to be harmful; or

- Result in the presence of contaminated soils or groundwater within the project area, and as a result, expose workers and/or the public to contaminated or hazardous materials during construction activities at levels in excess of those permitted by California Occupational Safety and Health Administration (Cal/OSHA) in CCR Title B and the Federal Occupational Safety and Health Administration (OSHA) in Title 29 CFR Part 1910.

4.7.4 Project Impacts and Mitigation Measures

The Rail Spur Project would result in the construction of new facilities that could lead to increased fire and explosion hazards at the refinery and along the railroad route to the refinery.

Impact #	Impact Description	Phase	Impact Classification
HM.1	The proposed rail spur unloading facility would increase the risk of an oil spill, fires and explosions at the refinery that could impact the public.	Operation	Class III

The new unloading facility would include an access platform and a system of pumps and meters, suction lines from the railcars, carbon beds for vapor treatment, and a common pipeline leading to the refinery's existing tank farm. The unloading facility would be equipped with two 10-car unloading systems. This would allow 20 rail cars to be unloaded at one time. The unloading rack would be configured to unload two 10-car strings simultaneously (one 10-car string on Track 1 and one 10-car string on Track 2). The system used to unload each car would consist of an adapter unit to connect the rail car to couplings, hoses, valves and piping connecting to a 400 gallon-per-minute (gpm) positive displacement pump. The system may employ articulated unloading arms as an alternative to flexible hoses for the connection to the rail cars. Each of the two unloading systems (one for Track 1 and one for Track 2) would be equipped with an air eliminator, two flow meters, and two carbon beds. Upon exiting each of the unloading pumps the crude oil from each unloading systems would be commingled into a common pipeline that would flow to the air eliminator and then to the flow meters. Upon exiting the flow meters the crude oil from the two unloading systems would be comingled and transported via a new pipeline to the existing refinery crude oil storage tanks.

All of the rail track extensions built as part of the Rail Spur Project would have to comply with the applicable California Public Utilities Commission (CPUC) general orders including:

- GO 26-D: Clearances on railroads and street railroads as to side and overhead structures, parallel tracks and crossings
- GO 72-B: Construction & Maintenance - Standard types of pavement construction at railroad grade crossings
- GO 75-D: Warning Devices for at-grade railroad crossings
- GO 118: Construction, reconstruction and maintenance of walkways and control, of vegetation adjacent to railroad tracks

Spills from the rail cars at the unloading rack would be contained within the oil and water catchment system and would not pose a significant hazard. Drain boxes would feed below-grade 16-inch-diameter drain lines routed to three parallel 20,000 gallon rectangular storage tanks (approximately 60,000 gallons total volume) located in a vault for containment. Two pumps would transfer any contained oil/water through a new pipeline into the existing refinery's oily water system. The system would be sized to contain the contents of one rail car as well as the foam and water that would be released from the fire suppression system. This system would effectively control any spill that would occur upstream of the crude oil pipeline. The spill containment system is shown in Project Description Figure 2-7.

Downstream of the two unloading facility meter assemblies, a new 24-inch above ground pipeline would be routed along an existing internal dirt road on the Phillips 66 property between the unloading facility and the refinery. This pipeline would connect with the existing refinery crude oil storage tanks. The route for this pipeline is shown in Project Description Figure 2-4. This dirt road accommodates periodic on-site traffic only associated with refinery personnel traveling at low-speeds.

The pipeline would be approximately 3,525 feet in length. The unloaded crude oil would be stored in the existing refinery storage tanks. Therefore, crude oil storage would not result in any increase in fire and explosion risk at the refinery.

The proposed unloading facility would have a maximum crude oil pumping rate of 8,000 gpm. The unloading facility and 24-inch pipeline would be monitored using multiple Programmable Logic Controllers (PLCs) and controlled using the existing refinery Supervisory Control and Data Acquisition (SCADA) system. The SCADA would detect a catastrophic failure of the 24-inch pipeline within one minute, thus limiting pumping losses. However, the drainage of the pipeline would occur, and potentially result in a worst-case of 90,000 gallons (2,160 barrels) of crude oil being spilled between the rail spur unloading racks and refinery.

Several crude oil spill scenarios were modeled to evaluate worst-case thermal radiation hazards associated with a large crude oil fire. Modeled scenarios ranged from small releases from a tank car, to the complete instantaneous loss of containment of a rail car contents. An explosion of a tank car, simulated as a Boiling Liquid Expanding Vapor Explosion (BLEVE), was also evaluated (see Appendix H for modeling input data and results). Worst-case thermal radiation injury levels would extend approximately 800 meters from the pool fire that could result from a catastrophic pipeline failure on the refinery site. Based on this modeling, it was determined that there would not be any potential for offsite injuries associated with worst-case unloading facility crude oil spill and fire. Therefore, potential hazards associated with the unloading facility are considered less than significant.

The SMR has a number of existing at grade road crossings with the refinery property. These at-grade crossings are along the various railroad spurs. The Rail Spur Project would add a number of new at-grade road crossing with it SMR property. With the increase level of train traffic that would occur with the Rail Spur Project, there would be an increased risk of accidents at these road crossings. However, given that the trains on site would only be moving at speeds of around three miles per hour these impacts would be considered less than significant.

Mitigation Measures

No mitigation measures are required since the impacts are less than significant. However, implementation of mitigation measures PS-3a through PS-3f for fire protection and emergency response would serve to further reduce the hazards associated with the Rail Spur Project. Also, the following mitigations are recommended to further reduce the hazards associated with at-grade road crossings with in SMR property.

HM-1a Prior to Notice to Proceed, the Applicant shall obtain Federal Railroad Administration DOT Numbers for all railroad spur crossings within the Santa Maria Refinery Site.

HM-1b Prior to Notice to Proceed, the Applicant shall install Crossbucks at all railroad spur crossings within the Santa Maria Refinery Site. The Crossbucks shall meet the California Public Utilities Commission Standard 1-R's for Crossbucks.

Residual Impacts

Hazards associated with the onsite portion of the Rail Spur Project would be less than significant (Class III).

Impact #	Impact Description	Phase	Impact Classification
HM.2	The potential for a crude oil unit train derailment would increase the risk to the public in the vicinity of the UPRR right-of-way.	Operations	Class III

The rail route in San Luis Obispo County was evaluated to determine accident rates and spill probabilities along the route as shown in Figure 4.7-4. The route was divided into distinct segments based on rail characteristics and population density along the railroad. Segments are shown based on the population density adjacent to the railroad. Crude oil spill probabilities for each of these segments are shown in Table 4.7.12.

As with the refinery spill analysis, several crude oil spill scenarios were modeled to evaluate worst-case thermal radiation hazards associated with a large crude oil fire. Modeled scenarios ranged from small releases from a tank car, to the complete instantaneous loss of containment of a rail car contents. An explosion of a tank car, simulated as a Boiling Liquid Expanding Vapor Explosion (BLEVE), was also evaluated (see Appendix H for modeling input data and results). Worst-case thermal radiation injury levels would extend approximately 500 meters from a pool fire and/or tank car explosion.

Table 4.7.12 Summary of Unit Train Accident and Spill Rates by Segment

Segment	Segment Description	Length (miles)	Accident Probability (year)	Population Density (per sq.mi.)	# of Trains (per year)	Project Oil Spill with Ignition			Project Oil Spill with no Ignition		
						All Spill Probability (per year)	Small Spill Probability (per year)	Large Spill Probability (per year)	All Spill Probability (per year)	Small Spill Probability (per year)	Large Spill Probability (per year)
1	101	2.7	2.65E-06	100	250	1.92E-07	1.13E-07	7.88E-08	1.92E-04	1.13E-04	7.88E-05
2	San Miguel	1.5	1.47E-06	3,000	250	1.06E-04	6.28E-05	4.37E-05	6.83E-19	4.03E-19	2.80E-19
3	101	1.9	1.87E-06	100	250	1.35E-07	7.98E-08	5.54E-08	1.35E-04	7.98E-05	5.54E-05
4	Wellsona	2.4	2.44E-06	1,000	250	1.77E-07	1.05E-07	7.26E-08	1.77E-04	1.05E-04	7.26E-05
5	101	2.1	2.12E-06	100	250	1.54E-07	9.07E-08	6.30E-08	1.54E-04	9.07E-05	6.30E-05
6	Paso Robles	1.2	1.16E-06	3,000	250	8.43E-08	4.97E-08	3.46E-08	8.43E-05	4.97E-05	3.46E-05
7	Paso Robles	0.4	4.34E-07	10,000	250	3.15E-08	1.86E-08	1.29E-08	3.15E-05	1.86E-05	1.29E-05
8	Paso Robles	2.1	2.14E-06	3,000	250	1.55E-07	9.15E-08	6.36E-08	1.55E-04	9.15E-05	6.36E-05
9	Paso Robles	2.7	2.75E-06	1,000	250	1.99E-07	1.18E-07	8.17E-08	1.99E-04	1.18E-04	8.17E-05
10	Paso Robles	0.8	8.41E-07	3,000	250	6.10E-08	3.60E-08	2.50E-08	6.10E-05	3.60E-05	2.50E-05
11	Paso Robles	0.5	5.13E-07	1,000	250	3.72E-08	2.20E-08	1.53E-08	3.72E-05	2.20E-05	1.53E-05
12	Templeton	2.1	2.14E-06	3,000	250	1.55E-07	9.15E-08	6.36E-08	1.55E-04	9.15E-05	6.36E-05
13	101	0.4	3.66E-07	1,000	250	2.65E-08	1.56E-08	1.09E-08	2.65E-05	1.56E-05	1.09E-05
14	Atascadero	0.4	4.30E-07	3,000	250	3.12E-08	1.84E-08	1.28E-08	3.12E-05	1.84E-05	1.28E-05
15	Atascadero	1.3	1.27E-06	1,000	250	9.23E-08	5.44E-08	3.78E-08	9.23E-05	5.44E-05	3.78E-05
16	Atascadero	1.6	1.60E-06	3,000	250	1.16E-07	6.84E-08	4.75E-08	1.16E-04	6.84E-05	4.75E-05
17	Atascadero	7.4	7.40E-06	1,000	250	5.37E-07	3.17E-07	2.20E-07	5.37E-04	3.17E-04	2.20E-04
18	Phillips PS	0.9	8.50E-07	100	250	6.16E-08	3.64E-08	2.53E-08	6.16E-05	3.64E-05	2.53E-05
19	Santa Margarita	0.9	8.82E-07	3,000	250	6.39E-08	3.77E-08	2.62E-08	6.39E-05	3.77E-05	2.62E-05
20	Santa Lucia	11.2	1.12E-05	100	250	8.10E-07	4.78E-07	3.32E-07	8.10E-04	4.78E-04	3.32E-04
21	CMC	0.8	7.63E-07	3,000	250	5.53E-08	3.26E-08	2.27E-08	5.53E-05	3.26E-05	2.27E-05
22	Chorro	1.6	1.56E-06	100	250	1.13E-07	6.69E-08	4.65E-08	1.13E-04	6.69E-05	4.65E-05
23	Chorro	0.4	4.26E-07	1,000	250	3.09E-08	1.82E-08	1.27E-08	3.09E-05	1.82E-05	1.27E-05
24	San Luis Obispo	0.6	5.65E-07	3,000	250	4.10E-08	2.42E-08	1.68E-08	4.10E-05	2.42E-05	1.68E-05
25	San Luis Obispo	4.3	4.30E-06	10,000	250	3.12E-07	1.84E-07	1.28E-07	3.12E-04	1.84E-04	1.28E-04
26	Edna	1.6	1.62E-06	100	250	1.17E-07	6.92E-08	4.81E-08	1.17E-04	6.92E-05	4.81E-05
27	Edna	0.6	5.86E-07	1,000	250	4.25E-08	2.50E-08	1.74E-08	4.25E-05	2.50E-05	1.74E-05
28	Price Canyon	5.2	5.18E-06	100	250	3.76E-07	2.22E-07	1.54E-07	3.76E-04	2.22E-04	1.54E-04
29	Pismo	0.4	3.69E-07	1,000	250	2.67E-08	1.58E-08	1.10E-08	2.67E-05	1.58E-05	1.10E-05

Table 4.7.12 Summary of Unit Train Accident and Spill Rates by Segment

Segment	Segment Description	Length (miles)	Accident Probability (year)	Population Density (per sq.mi.)	# of Trains (per year)	Project Oil Spill with Ignition			Project Oil Spill with no Ignition		
						All Spill Probability (per year)	Small Spill Probability (per year)	Large Spill Probability (per year)	All Spill Probability (per year)	Small Spill Probability (per year)	Large Spill Probability (per year)
30	Pismo	0.3	2.89E-07	3,000	250	2.09E-08	1.24E-08	8.59E-09	2.09E-05	1.24E-05	8.59E-06
31	Pismo/Grover	2.1	2.10E-06	10,000	250	1.52E-07	8.97E-08	6.24E-08	1.52E-04	8.97E-05	6.24E-05
32	Oceano	0.2	2.39E-07	3,000	250	1.73E-08	1.02E-08	7.10E-09	1.73E-05	1.02E-05	7.10E-06
33	Oceano	0.6	6.24E-07	10,000	250	4.53E-08	2.67E-08	1.86E-08	4.53E-05	2.67E-05	1.86E-05
34	Oceano	0.4	4.02E-07	3,000	250	2.92E-08	1.72E-08	1.20E-08	2.92E-05	1.72E-05	1.20E-05
35	Arroyo Grande	1.4	1.38E-06	100	250	1.00E-07	5.91E-08	4.11E-08	1.00E-04	5.91E-05	4.11E-05
36	Arroyo Grande	0.9	9.40E-07	1,000	250	6.81E-08	4.02E-08	2.79E-08	6.81E-05	4.02E-05	2.79E-05
37	Arroyo Grande	0.8	7.98E-07	100	250	5.79E-08	3.41E-08	2.37E-08	5.79E-05	3.41E-05	2.37E-05
38	Arroyo Grande	1.1	1.12E-06	1,000	250	8.12E-08	4.79E-08	3.33E-08	8.12E-05	4.79E-05	3.33E-05
39	Oso Flaco	2.8	2.77E-06	100	250	2.01E-07	1.18E-07	8.23E-08	2.01E-04	1.18E-04	8.23E-05
40	Nipomo	0.6	6.37E-07	1,000	250	4.62E-08	2.72E-08	1.89E-08	4.62E-05	2.72E-05	1.89E-05
41	Nipomo	1.5	1.47E-06	100	250	1.07E-07	6.29E-08	4.37E-08	1.07E-04	6.29E-05	4.37E-05
Total/Weighted Average		72.6	6.09E-05			4.42E-06	2.61E-06	1.81E-06	4.42E-03	2.61E-03	1.81E-03
Return Period						226,358	383,658	552,094	226	384	552

A transportation QRA was prepared following the guidelines of the American Institute of Chemical Engineers, Center for Chemical Process Safety (CCPS, 1995) and the parameters discussed in Section 4.7.1.3. The results of the QRA are presented in Figure 4.7-5 and show that potential impacts would be considered less than significant based on the significant risk criteria.

The diagonal dashed green and red lines in Figure 4.7-5 represent the significant risk threshold for insignificant (green) and significant and unavoidable (red) risk. If the risk falls between the dashed green and red lines, a project can be permitted if all feasible mitigation has been identified. The graph on the left shows the risk for potential injuries, while the graph on the right shows the risk for potential fatalities.

The level of risk for the Rail Spur Project is the blue lines in Figure 4.7-5. Because maximum risks from proposed transport of crude oil are below the significant risk threshold (dashed green line), impacts would be considered less than significant.

Mitigation Measures
No mitigation measures are required since the impact is less than significant.

Residual Impacts
Hazards associated with the Rail Spur Project transportation risk along the UPRR right-of-way would be less than significant (Class III).

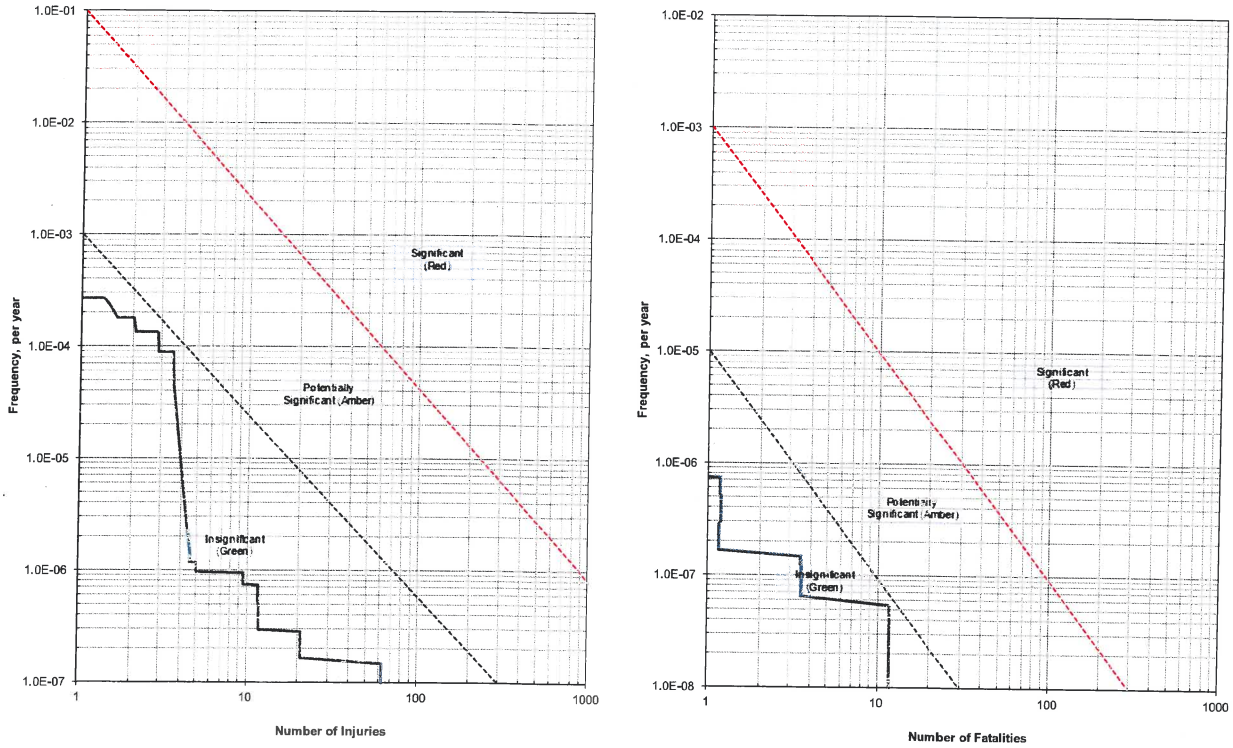
4.7.5 Cumulative Analysis

The Rail Spur Project would not significantly contribute to the risk associated with any of the proposed development projects found under the cumulative projects list (see Chapter 3.0, Cumulative Scenario and Methodology). A brief description of potential cumulative hazards for relevant projects is provided below:

Philips 66 Co. – Refinery Throughput Increase. As noted in the Refinery Throughput Increase FEIR releases of hazardous materials from the project site would not acutely impact nearby residences, agriculture, or industrial facilities due to the distance for offsite receptors. The closest population to the crude oil tanks at the SMR is an industrial area 425 feet northeast of the crude oil storage facilities. The closest residence to the crude oil tanks, which is located within the industrial area, is 1,200 feet northeast of the tank storage area. The gas processing equipment and piping are approximately 1,700 feet from the fence line and the closest receptor on industrial property. Given the limited population and significant distance between these receptors and the SMR, there would not be a significant risk level. The same is the case for the proposed rail spur unloading facilities, where worst-case hazards would not extend beyond the SMF property. Therefore, there is no increase in cumulative risk associated with the proposed Rail Spur Project and Refinery Throughput Increase Project.

Philips 66 Co. – Removal of Soil and Debris Mound. As with the Refinery Throughput Increase Project, there would be no cumulative increase in offsite hazards. Therefore, there is no increase in cumulative risk associated with the Rail Spur Project and removal of the soil and debris mound at the refinery.

Figure 4.7-5 Risk Associated with Crude Oil Unit Train Transportation



Phillips 66 Pipeline Project/Freeport-McMoRan Oil & Gas Oil Field Expansion. The proposed Phillips pipeline route would be located relatively close to the UPRR railroad in Price Canyon. There is the potential for some overlap in hazards associated with a pipeline crude oil spill and a unit train derailment. The probability of a train derailment and oil spill on the Price Canyon segment of the UPRR route is approximately 5.2 in a million, with the probability of a spill and crude oil fire being less than one in a million for this segment. Given the low probability of a train derailment, oil spill and fire in the vicinity of the proposed Phillips 66 Pipeline and Freeport-McMoRan Oil & Gas Oil Field Expansion Projects, the Rail Spur Project would not significantly contribute to the potential cumulative risk in Price Canyon. Therefore, potential cumulative risks are considered less than significant.

4.7.6 Mitigation Monitoring Plan

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
HM-1a	Prior to Notice to Proceed, the Applicant shall obtain Federal Railroad Administration DOT Numbers for all railroad crossings within the Santa Maria Refinery Site.	Review of FTA Documents	Prior to Notice to Proceed	County Planning and Building
HM-1b	Prior to Notice to Proceed, the Applicant shall install Crossbucks at all railroad crossings within the Santa Maria Refinery Site. The Crossbucks shall meet the California Public Utilities Commission Standard 1-R's for Crossbucks.	Review of design drawing Site Inspection	Prior to Notice to Proceed	County Planning and Building

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Exhibit C

EXHIBIT

Exhibit C

Derailment Probability Analyses and Modeling of Mainline Freight Trains

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Summary: We conducted statistical analyses and used modeling techniques to develop derailment probabilities for freight trains and freight cars operating on North American railroads. Knowing the expected frequency of derailment and the conditional probabilities of derailment for individual cars enables estimation of the derailment risk as it is affected by train length, operating speed, and positioning of cars in the consist. These results can be used to quantify the benefit in terms of reduced accident probability and severity of various changes in railroad operating and safety practices.

Index Terms: safety, risk, accident rate, derailment probability

1 INTRODUCTION

The purpose of this research is to quantify the benefits in reduced derailment risk that can be achieved through various changes in railroad operating practices. We will consider the effects of train speed and train length on the probability of derailment for individual cars within a train consist. The probability that a train will be involved in a derailment is a function of the quality of track, the length of train, and the exposure in terms of miles traveled. The probability of derailment for individual cars within a derailed train consist is a function of the point-of-derailment (POD), train length, train speed, and the accident cause. Changes to any of these parameters can alter the risk level of particular shipments.

We will present methodologies to model the derailment potential to train consists and individual cars within the train. We will then present a derailment risk calculation for a specific shipping scenario, showing the effect of train length, train speed, and positioning on the overall derailment potential for various cars within the train consist.

The following analyses used accident data collected by the Federal Railroad Administration (FRA) in the Railroad Accident/Incident Reporting System (RAIRS) database [1]. This paper will focus on derailments of Class I railroad freight trains on mainline track that occurred in the ten-year period, 1992 to 2001.

2 SPEED & TRACK CLASS EFFECTS

It has been shown that the speed at which a derailment occurs can be a predictive measure of the severity of derailment [2, 3]. To better understand the effect of speed on derailment severity, the accidents in our analysis are grouped by train speed, FRA track class, and number of cars derailed (Table 1). Track class is representative of track quality and minimum standards are specified by regulation for each class. The seven FRA track classes and associated freight train speed restrictions are as follows:

MAXIMUM SPEED	FRA TRACK CLASS					
	X/1	2	3	4	5	6
mph	10	25	40	60	80	110
km/h	16	40	64	97	129	177

The speed groups are associated with the maximum speed distinctions between levels of track class and are: 1-10, 11-25, 26-40, & >40 mph. The majority of freight trains are operated at speeds below 60 mph and there are few accidents at speeds above this; therefore, accidents occurring at speeds above 60 mph were grouped with those occurring at speeds between 41 and 60 mph. Due to the relatively small number of accidents occurring on excepted and class 6 track, accidents on class X track are combined with class 1 track and accidents on class 6 track are combined with class 5 track. The accidents are further divided into five bins based on the total number of cars derailed, as follows: 1-5, 6-10, 11-15, 16-20, 20-25, & >25 cars derailed.

For the ten-year study period, there were 4,661 train accident reports for Class I railroad freight train derailments on mainline track[1]. The average speed of derailment was 24.8 mph.

[1] Of these, 66 have a speed of zero and 45 have zero cars derailed (11 have both) and 15 do not have a value for track class.

TABLE 1 Derailed Train Counts by Train Speed, Track Class, and Number of Cars Derailed

Speed (mph)	FRA Track Class	Cars Derailed							Total Cars Derailed	Average Cars Derailed
		1-5	6-10	11-15	16-20	21-25	>25	Total		
1-10	X/1	353	154	55	11	4	2	583	3,230	5.6
	2	138	63	14	6	3	2	228	1,314	5.8
	3	128	44	13	2	6	2	199	1,033	5.2
	4	150	42	12	3	1	3	216	1,032	4.8
	5/6	41	7	3	0	0	0	51	189	3.7
	Total	815	312	98	22	14	9	1,285	6,845	5.3
11-25	X/1	44	29	2	1	1	0	79	391	4.9
	2	260	187	112	32	18	12	622	4,853	7.8
	3	162	75	30	22	5	3	300	1,925	6.4
	4	149	74	44	17	5	4	294	2,027	6.9
	5/6	25	15	8	1	0	0	49	291	5.9
	Total	643	381	196	73	29	19	1,348	9,503	7.0
26-40	X/1	3	0	1	0	0	0	4	25	6.3
	2	25	8	12	8	4	6	63	739	11.7
	3	186	88	85	61	45	63	529	6,344	12.0
	4	163	59	66	44	28	31	394	4,032	10.2
	5/6	37	13	8	8	3	2	71	515	7.3
	Total	414	169	172	121	80	102	1,062	11,663	11.0
>40	X/1	2	0	0	1	1	0	4	44	11.0
	2	1	1	1	0	0	5	8	299	37.4
	3	42	11	11	17	9	17	107	1,444	13.5
	4	275	67	69	55	42	109	621	7,720	12.4
	5/6	74	18	16	15	7	24	158	1,717	10.9
	Total	394	97	98	89	59	155	890	11,251	12.5
Total	X/1	408	184	58	13	6	2	671	3,690	5.5
	2	429	259	139	46	25	25	923	7,205	7.8
	3	530	218	139	102	65	86	1,140	10,746	9.4
	4	752	243	191	120	77	151	1,534	14,811	9.7
	5/6	182	54	35	24	10	28	333	2,712	8.1
	Total	2,309	962	564	306	183	292	4,661	39,747	8.5

** Note: Totals include those accident reports for which values of speed, track class, or total cars derailed were either zero or blank. **

The following observations can be made regarding Table 1:

- Nearly half of all derailed train consists have five or fewer cars derailed.
- Only 6.3% of all trains derailed more than 25 cars; 90% of these were at speeds greater than 25 mph.
- One-third of all trains were derailed on class 4 track and nearly 25% derailed on class 3 track[2].
- 265 trains (5.7% of total) derailed at speeds exceeding the maximum allowable operating speed for the track class on which it was derailed. While the largest portion of these were low consequence derailments (1-5 cars derailed), these accidents still accounted for nearly 3,000 derailed cars.

While it is apparent that more cars are derailed, on average, at higher speeds, it is not clear that more cars are derailed, on average, on higher track classes. This may be due to the fact that many of the derailments on higher class track occur at less than normal track speed or may be due to the differences in derailment severity for different accident causes, which is likely correlated with track quality (class).

3 TRAIN LENGTH EFFECTS

The likelihood that a train will be involved in an accident is a function of both train-miles (TM) and car-miles (CM) operated [5]. Car-mile related causes are those for which the likelihood of an accident is proportional to the number of car-miles operated. These include most equipment failures for which accident likelihood is directly proportional to the number of components (e.g. bearing failure) and also include most track component failures for which accident likelihood is proportional to the number of

[2] Approximately 70% off all traffic is carried over these two track classes for Class I railroads [4].

load cycles imposed on the track (e.g. broken rails or welds). Train-mile related causes are those for which accident likelihood is proportional to the number of train-miles operated. These include most human error failures for which accident likelihood is independent of train length and depends only on exposure (e.g. grade crossing collisions).

Each FRA accident cause code has been grouped into 51 groups of related causes that share similar causal mechanisms based on a scheme developed for the IIRSTF hazardous materials risk model [5] and included in a 2001 unpublished report of the Association of American Railroads. Each cause group is categorized as either a CM or TM caused accident group. The probability that an accident will occur is then a summation of the number of train-miles multiplied by the train-mile accident rate and the number of car-miles multiplied by the car-mile accident rate. Thus, it follows that longer trains have an increased likelihood of having an accident due to a larger number of car-miles of exposure.

In 2001, the average number of cars per freight train of Class I freight railroads was 68.5 cars [6]. In the same year, the average length of derailed Class I freight trains was 78.6 cars [1]. These two statistics are consistent with the hypothesis that longer trains have a higher likelihood of derailment. Shorter trains may have a lower risk of derailment; however, more trains must be operated to ship the same number of cars. In light of the trade-off between car-mile and train-mile-caused derailments, there may be an optimal train length to minimize derailment occurrence.

4 POSITIONS OF DERAILED CARS

The first vehicle (lead locomotive) in the freight train is most frequently the first to derail. In one-quarter of all derailments, the point-of-derailment (POD) is located within the first ten positions of the train. Over 98% of all train consists analyzed had train lengths greater than ten cars. The large percentage of derailments with cars near the front of the train being first to derail is primarily due to the large proportion of track-related causes, many of which tend to derail the lead locomotive [1].

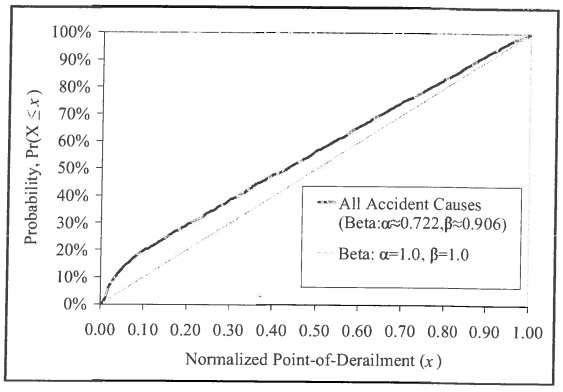

Figure 1 Point-of-Derailment Probabilities

The relationship between point-of-derailment (normalized by train length, NPOD) and position-in-train indicates that a large proportion of derailments initiate at the front of the train (Figure 1). This is often the case for track-caused derailments. We modeled NPOD probabilities by regression of the data against the beta distribution with parameters, α and β. The modeled NPOD distribution uses the beta distribution parameters that minimize the error sum of squares between the data and the beta distribution percentages. This allows for a smooth, continuous description of NPOD probabilities. The POD probabilities for various positions and train lengths can then be determined by discretizing the cumulative beta distribution.

The frequency of derailment for each position in the train (Figure 2) is obtained by counting the number of times vehicles in each position derailed (for all consist lengths). Although the first position most commonly derails first, it is not the position most frequently derailed. In absolute terms, the car in the eleventh position is derailed most frequently.

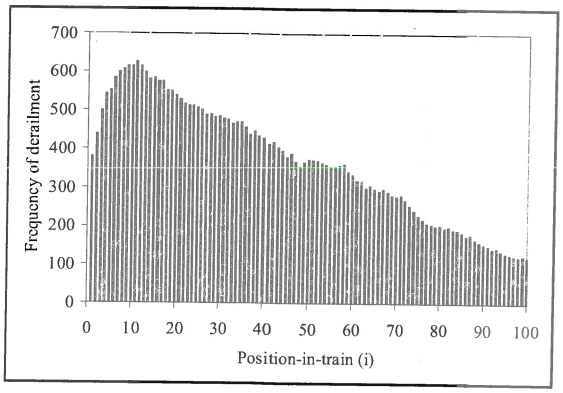

Figure 2 Frequency of Derailment by Position-in-Train

5 SEVERITY OF DERAILMENT

For all accident causes combined, the modal number of cars derailed is one, decreasing exponentially thereafter with about eight cars derailing on average. This distribution is not the same for all accident causes or accident speeds. For example, derailments caused by broken rail or welds tend to derail more than twice as many cars, on average, than bearing failure-caused derailments [3].

We have developed an analytical model for estimating the severity of derailment in terms of the number of cars derailed. Various factors considered include: accident cause, train speed, and residual train length (i.e. the number of cars behind the POD).

Prior work by Yang et al. [7, 8] analyzed the effects of several different variables on the severity of derailment. No explicit equations were given, but the relationships between the variables and the number of cars derailed were

determined by varying the parameters in the simulation model and observing the change in derailment severity. Nayak et al. [2] presented an equation for estimating the number of cars derailed as a function of the square root of train speed.

Saccomanno & El-Hage [9, 10] combined the effects of accident cause, train speed, and residual train length into a single equation based on a truncated geometric distribution for estimating the mean number of cars derailed (Appendix). Our investigations indicate that the equation for the mean of the truncated geometric distribution presented by Saccomanno & El-Hage was incorrect. The correct equation presented here (Eq. A.5) ensures that the number of cars derailed lies within the range [1, L_r] where L_r is residual train length.

Using the correct equation for the mean of the truncated geometric distribution (Eq. A.5), we used nonlinear regression techniques to estimate the parameters of the response function (Eq. A.4) for all accident causes combined. The value for parameter a was estimated to be 0.56 with a standard error of 0.02. The results showed that the value estimated for parameter c was not statistically different than 0 (at the 95% confidence level) while the value for parameter b was estimated to be -0.97 with a standard error of 0.03. If parameter c is assigned a value of 0, the effect of residual train length is entirely accounted for by Eq. A.5 (i.e. the logistic function p remains constant for all positions). This model was able to account for 40% of the variation in the number of cars derailed when all accident causes are combined. If accidents are separated by cause group, the model accounts for more than 60% of the variation for certain accident causes [Anderson & Barkan, unpublished].

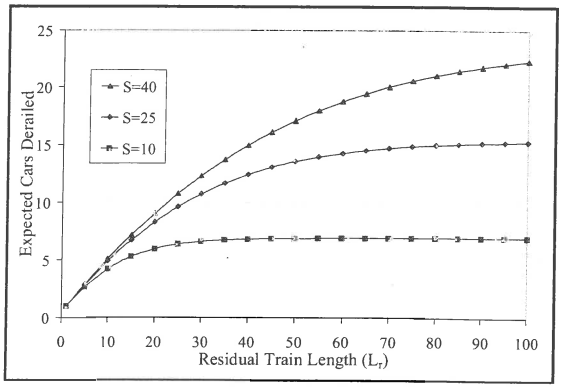

Figure 3 Cars Derailed by Residual Train Length & Speed (S)

The geometric model predicts that the number of cars derailed increases asymptotically with increases in the number of cars behind the POD and train speed (Figure 3).

6 PROBABILITIES OF DERAILMENT

In the following section, we consider the conditional probabilities of derailment for cars in a derailed train consist. The only analytical technique for determining the conditional probability of derailment that we are aware of is that of Saccomanno & El-Hage [9, 10]. Their equation (Eq. A.1) combines two probabilities: 1) the probability of a derailment initiating at the k^{th} position and 2) the probability of derailing x cars based on the point-of-derailment for a given train length.

Using the POD probabilities derived from Figure 1, and the parameters for the response function given above, we calculated the conditional derailment probabilities for all accident causes combined for different train lengths at 25 and 50 mph (Figure 4). The following observations can be made regarding this figure:

- The lowest derailment probabilities occur in the front and rear sections of the train
- As train length decreases or train speed increases, the probability of derailment increases for all positions (except $i = 1$), and most notably for those in the middle.

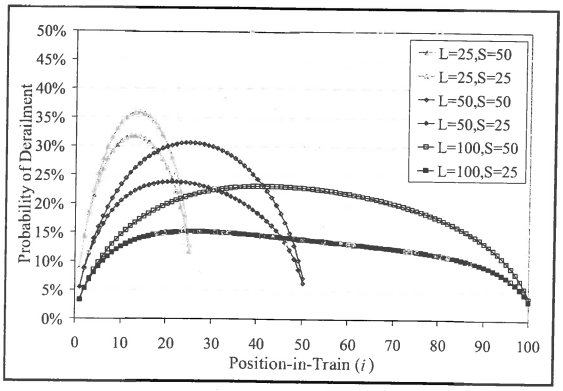

Figure 4 Derailment Probabilities by Position, Length (L) & Speed (S)

6.1 Empirical Validity

If we analyze the relative position of derailed cars (absolute position normalized by train length), the derailment probability is the number of cars derailed divided by the total number of cars derailed within the quantile of interest (Figure 5).

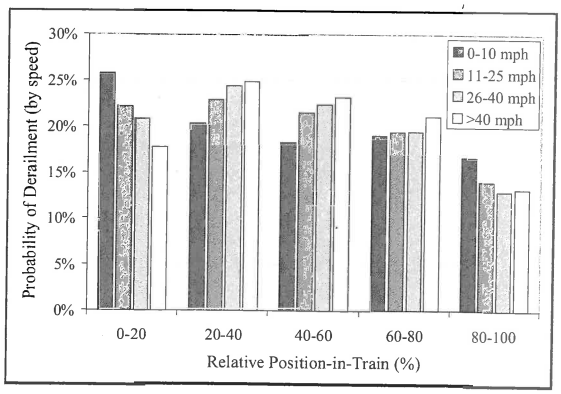

Figure 5 Derailment Probabilities by Relative Position-in-Train

Derailment probabilities by relative position sum to 100% (unlike those by absolute position, Figure 4). In general, cars within the second quintile have the highest probability of derailment while cars in the last quintile of the train have the lowest derailment probability. As train speed increases, the probability of derailment for cars in the front of train decreases in response to the increase in derailment probability for the second and third quintiles of the train.

7 RISK SENSITIVITY

In this section, we consider the effects of different operating practices on derailment probabilities. This analysis considers the shipment of one-thousand cars a distance of 1,000 miles over class 4 track. If train length is reduced, more train shipments will be required to haul the same number of cars—increasing the exposure to having an individual train consist derail. If train speed is increased, the expected derailment severity also increases. We consider the sensitivity to train length (25, 50, 100, 125, & 200 cars) and operating speed (25 & 50 mph) on the probability of derailment for various cars within the consist.

For class 4 track, estimated derailment rates are 7.8 derailments per billion freight car-miles (FCM) or 0.53 derailments per million freight train-miles (FTM) [4]. Using the grouping scheme mentioned above, approximately 75% of all Class I derailments can be classified as car-mile caused, while 25% are classified as train-mile caused[3]. Using these percentages, the corresponding derailment rates are 5.9 and 0.13 per billion FCM and million FTM, respectively.

The probability that an individual train of length L traveling on class 4 track a distance of M miles is involved in a derailment, $P_1(der)$, is as follows:

$$P_1(der) = 1 - e^{-M[5.9x10^{-9}(L)+0.13x10^{-6}]} \quad \text{(Eq. 1a)}$$

For $P_1(der) \ll 1$, Eq. 1a can be simplified to the following:

$$P_1(der) = M[5.9x10^{-9}(L) + 0.13x10^{-6}] \quad \text{(Eq. 1b)}$$

The probability that one or more of S train shipments (with the same characteristics, i.e. train length and shipping distance) is involved in a derailment, $P_S(der)$, is as follows:

$$P_S(der) = 1 - [1 - P_1(der)]^S \quad \text{(Eq. 2)}$$

The portion of $P_1(der)$ due to train-mile causes is constant for all train lengths, while the portion of $P_S(der)$ due to car-mile causes is approximately constant for all train lengths[4].

[3] There is a slight tendency for a larger proportion of car-mile caused derailments on higher track classes (likely due to higher operating speeds).

[4] As $P_1(der) \ll 1$, $P_S(der) \approx S \cdot P_1(der)$; therefore, $S \cdot M[5.9x10^{-9}(L)]$ is constant for all train lengths as $S \cdot L = 1{,}000$ cars.

For the scenario considered of 1,000 cars shipped 1,000 miles, $P_{1\text{-}TM}(der) = 0.13x10^{-3}$ and $P_{S\text{-}CM}(der) \approx 5.9x10^{-3}$. Therefore, $P_1(der)$ is directly proportional to train length while $P_S(der)$ decreases asymptotically with increases in train length (Table 2).

We observe that longer trains have an increased likelihood of being involved in a derailment. For a fixed number of cars; however, fewer train shipments are required for longer trains, thereby decreasing the overall risk that one or more trains will be involved in a derailment.

TABLE 2 Probability of Derailment by Train Length

Train Length, L	Train Shipments, S	$P_1(der)$ (x 10^{-3})	$P_S(der)$ (x 10^{-3})
25	40	0.278	11.040
50	20	0.425	8.466
100	10	0.720	7.177
125	8	0.868	6.919
200	5	1.310	6.533

The risk of derailment for a car in the i^{th} position is a combination of the probability of derailment for the train consist, $P_1(der)$, and the conditional derailment probability for the car in a derailed consist, $P(i|der)$. For S train shipments, the probability of derailment for a car in the i^{th} position, $P_S(i)$, is as follows[5]:

$$P_S(i) = 1 - [1 - P_1(der) \cdot P(i \mid der)]^S \quad \text{(Eq. 3)}$$

Using the results from above, we calculated $P(i|der)$ for the first, tenth, and last car for each of the five consist lengths at 25 and 50 mph, as well as for the position with highest derailment probability (Table 3).

TABLE 3 Conditional Derailment Probabilities by Length & Speed

Case No.	Train Length	Speed (mph)	$P(i\|der)$ i=1	i=10	i=L	$i=i_{max}$	i_{max}
0	25	25	9.07%	30.9%	11.78%	31.8%	13
1	25	50	9.07%	34.1%	12.87%	35.9%	14
2	50	25	5.49%	20.5%	6.31%	23.8%	21
3	50	50	5.49%	23.3%	7.18%	30.6%	25
4	100	25	3.33%	12.6%	3.31%	15.2%	26
5	100	50	3.33%	14.7%	3.84%	23.1%	42
6	125	25	2.83%	10.7%	2.69%	12.9%	26
7	125	50	2.83%	12.5%	3.12%	20.3%	47
8	200	25	2.02%	7.6%	1.75%	9.2%	26
9	200	50	2.02%	8.9%	2.02%	14.8%	51

From these results, we observe:

- The probability that the first car derails is simply the probability that the POD=1; this probability decreases with increased train length and is unaffected by speed.
- For i=10 and i=L (the last car), the probability of derailment is 13-17% higher at 50 mph than at 25 mph for each train length.
- The position with highest derailment probability (i_{max}) increases asymptotically with increased train speed and train length.

[5] As $P_1(der) \ll 1$, $P_S(i) \approx P_S(der) \cdot P(i|der)$.

- Cars positioned in the middle sections of the train have the highest probabilities of derailment while the front and rear sections of a train have the lowest probabilities of derailment.

Applying Eq. 3 to the results in Tables 2 & 3, we derived derailment probabilities for each of the ten cases for each car position (Figure 6). For a given speed and car position, there appears to be a significant reduction in derailment probability as train length is increased up to 100-car trains and is largely due to the lower probability of derailment, $P_S(der)$. As train length is further increased to 125 and 200 cars, the reduction becomes much smaller. Again, for a given position and train length, the increase in risk by shipment at 50 mph is 13-17% higher than at 25 mph.

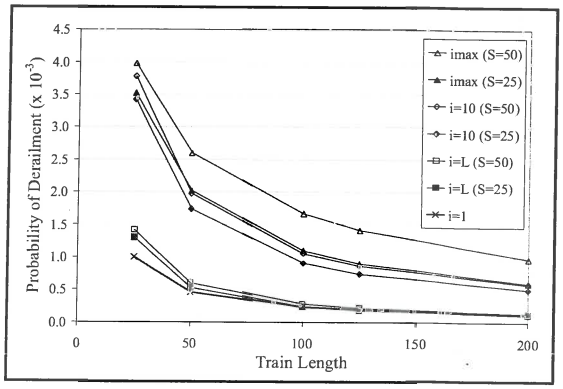

Figure 6 Derailment Risk by Length (L), Speed (S), & Position (i)

8 CONCLUSIONS

In this paper, we have examined the probabilities of derailment for freight trains and freight cars as affected by train length, train speed, and positioning of cars within the consist.

The probability of derailment for a single train is largely a function of track class, distance traveled, and train length. While a shorter train will have a lower probability of derailment, shipments of longer trains will have a lower probability that one or more trains will be derailed (for a fixed quantity of cars shipped).

The probability that a particular car will be derailed in a derailment is largely a function of train length, train speed, and positioning within the consist. More cars can be expected to derail with increases in train speed and residual train length. Cars positioned near the front or rear of a train have the lowest probability of being derailed in a derailment. As train length is decreased or train speed is increased, the conditional probability of derailment increases for all cars within the train consist.

As with any effective risk reduction option, the expected benefits from any changes in railroad operating practices must be compared with the costs associated with lowering the risk of derailment. For example, if train speed is reduced, the risk of derailment is lowered at the expense of increasing shipment time and possibly reducing traffic throughput. Physical constraints, such as siding lengths, may control the length of trains that can shipped over particular corridors. Other constraints, such as train handling procedures and train make-up regulations, may also affect the placement of cars within the consist. These and all other operational constraints must be considered before any change in operating procedure is implemented to reduce derailment risk. The optimal cost-effective configuration would allow for the necessary throughput at the lowest possible risk level.

9 APPENDIX

Saccomanno & El-Hage [9, 10] Equations:

$$P(i \mid der) = \sum_{k=1}^{i} \{P_p(k) \times \sum_{x=i-k+1}^{L_r} P(x)\} \qquad \text{(Eq. A.1)}$$

- $P(i|der)$ = conditional probability of derailment for car in the i^{th} position of a derailed train consist
- $P_p(k)$ = point-of-derailment probability for the car in the k^{th} position of a train
- $P(x)$ = probability of derailing x cars in a train derailment (truncated geometric distribution)
- L_r = residual train length (i.e. number of cars behind the POD)

$$P(x) = \frac{p(1-p)^{x-1}}{1-(1-p)^{L_r}} \qquad \text{(Eq. A.2)}$$

- p = logistic function of continuous "success" probability
- Range: $1 \le x \le L_r$

$$p = \frac{e^Z}{(1+e^Z)} \qquad \text{(Eq. A.3)}$$

- Z = response function based on the cause of derailment (C_d), train speed (S), and residual train length (L_r)

$$Z = a \mid C_d + b \times \ln(S) + c \times \ln(L_r) \qquad \text{(Eq. A.4)}$$

- Parameter a is dependent upon the cause of derailment ($a|C_d$)

$$D = \frac{1}{p} - \frac{L_r(1-p)^{L_r}}{1-(1-p)^{L_r}} \qquad \text{(Eq. A.5)}$$

- D = the mean of the truncated geometric distribution (i.e. the estimated number of cars derailed)

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Expert Report of Greg Karras
Communities for a Better Environment (CBE)
2 February 2015

Regarding the

Phillips 66 Company Propane Recovery Project
Recirculated Final Environmental Impact Report (RFEIR)
Released in January 2015 by the Contra Costa County
Department of Conservation and Development
State Clearinghouse #2012072046
County File #LP12-2073

I, Greg Karras, declare and say:

1. I reside in unincorporated Marin County and am employed as a Senior Scientist for Communities for a Better Environment (CBE). My duties for CBE include technical research, analysis, and review of information regarding industrial health and safety investigation, pollution prevention engineering, pollutant releases into the environment, and potential effects of environmental pollutant accumulation and exposure. My qualifications, curriculum vitae, and publications list were provided with my previous reports on the project and its draft and recirculated draft Environmental Impact Report (DEIR, and RDEIR, respectively).[1]

2. I have reviewed the Phillips 66 Company 'Propane Recovery Project' (project) Recirculated Final Environmental Impact Report (RFEIR) and reassert my previous comments as they remain valid and have not been addressed in the RFEIR. In its attempt to rationalize its decision not to analyze or even disclose the changes in oil feedstock that will be necessary to implement the project, and despite the potential pollution and hazard impacts from those feedstock changes, the RFEIR repeats the unsupported assertion that sufficient propane and butane (LPG) is recoverable in the project baseline. The RFEIR does not include any publicly verifiable data supporting this assertion, or consider evidence provided by the public indicating that a change in the refinery's oil feedstock

[1] *See* esp. my reports dated 4 September 2013 report (Karras Rodeo Report-1) and 5 December 2014 (Karras Rodeo Report-2). *See* also my 7 January 2014 Supplemental Evidence–B (CBE Supp-B), 14 January 2014 Supp. Evidence–C (CBE Supp-C), 20 January 2014 Supp. Evidence–D (CBE Supp-D; co-authored with Roger Lin), and 24 November 2014 report regarding the 'Rail Spur Extension and Crude Unloading Project' (Karras Rail Spur Report). Each of these documents and its attachments was provided to Contra Costa County and is incorporated herein.

will be necessary to provide enough LPG for the proposed project.[2] However, the RFEIR does more specifically delimit the *type* of measurements it purports to rely upon for its LPG baseline estimate. My review of the project and RFEIR reported herein focuses on the adequacy of its project description and analysis of potential environmental impacts with respect to this new information on the type of measurements that the RFEIR relies upon for that baseline analysis. My opinions on these matters and the basis for these opinions are stated in this report.

3. According to the RFEIR, the type of data it used to estimate LPG recoverable in the project baseline was limited to project design data. It relies on measurements during August 2011 that Phillips 66 used as the project "design basis" for its conclusion that "the existing Refinery baseline condition had and has sufficient propane and butane feedstocks to support the extraction rates of propane and butane sought by Phillips 66 for the proposed Project." (RFEIR at 2-3, 2-5, 2-6.) The RFEIR mentions other data, but in response to CBE's previous comment that the RDEIR was wrong to include those 2013 data in the baseline and the refinery had already begun to change its feedstock by then (RFEIR at 3.2-77), the RFEIR confirms this reliance on the 2011 design basis data:

> "[T]he actual sampling and measurements of propane and butane in the refinery fuel gas (RFG) at the Refinery that was used as the basis for the design and permit limit of 14,500 barrels per day (BPD) occurred in 2011, not 2013 as the commenter appears to suggest. The sampling data for year 2013 is presented in the RDEIR for informational purposes and does not represent the baseline for the proposed Project … ." (RFEIR at 3.2-128; RTC B9-25; emphasis added.)

4. 'Design basis' means the conditions that are taken into account when designing a facility or product.[3] Those include anticipated post-project conditions. 'Project baseline' means existing conditions, not post-project conditions. Equating data representing design basis conditions with those representing current baseline conditions is a logical fallacy, but the RFEIR does exactly that. This is a clear error in its project description.

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[2] *See* Karras Rodeo Report-1; CBE Supp-C; CBE Supp-D; Karras Rodeo Report-2; Karras Rail Spur Report; and the comments and reports of Drs. Fox and Pless in this matter.
[3] *See* Black's Law Dictionary (http://thelawdictionary.org/design-basis/#ixzz3QRYQrkhw).

5. Future conditions that are taken into account when designing facilities to make refined products include, among others, potential post-construction changes in operation, production, and environmental health and safety due to changes in facility oil feedstock.[4]

6. The refinery's oil feedstock will almost certainly change during the proposed project's operating term. This is shown by processing data, dwindling current crude supplies, the company's plans to replace them with 'advantaged crudes' that include diluent/bitumen ('dilbit') blends from Canada and shale oils from the Bakken region, and its current wharf and throughput expansion and rail spur proposals that would enable those plans.[5] Indeed, while it errs in disputing the relevance of this change in feedstock, the RFEIR does not dispute the *potential* for this oil switch.

7. Phillips 66 has a strong incentive to design its project based on measurements taken when it was processing samples of feedstock blends similar to those it could process during the project's operating life. Not to do so would risk capital on a potentially underproductive or stranded asset. For example, LPG yields from delayed coking—a major producer of LPG in this refinery—vary greatly when coker feedstock is derived from different crude oils.[6] Even when detailed composition data are available for each oil in a new feedstock blend, predictions about the behavior of the *blend* during actual conversion processing remain limited and uncertain until the complex interactions of blend-specific components are tested directly in practice.[7]

8. The volume and country of origin of each oil shipment imported and processed by each refinery in the U.S. each month, as well as the density and sulfur content of each such shipment that is crude oil, is reported publicly by the U.S. Energy Information Administration (EIA). These EIA data for the period from 1 January 2006 through 30 November 2014 are appended hereto as Attachment K3-1.

9. During the five months through August 2011, when the RFEIR states that Phillips 66 took the measurements of the refinery that were used as the design basis for the

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[4] *See* Meyers, 1986; Speight, 1991; Karras, 2010; Bredeson et al., 2010; UCS, 2011; Abella and Bergerson, 2012; Brandt, 2012; API, 2009; CSB, 2013 *in* Karras Rodeo Report-1 attachments.
[5] CBE and others provided abundant evidence for each of these points: *see* Karras Rodeo Report-1; Karras Rodeo Report-2; Karras Rail Spur Report, and the comments of Drs. Fox and Pless.
[6] *See* Meyers, 1986 *in* Karras Rodeo Report-1 and attachments thereto. *See* esp. Karras Rodeo Report-1 at Table 2, page 7 and Meyers tables 7.1-2 and 7.1-6.
[7] Speight, 1991 at 301-305 *in* Karras Rodeo Report-1 attachments.

project (April–August), the refinery received ≈ 1.5 million barrels of 40.1 °API gravity, 0.61 wt. % sulfur crude oil from Russia for processing in four consecutive shipments. (Att. K3-1.) The refinery did not normally run this particular crude oil. This 1.5 million barrels from April–August 2011 represents only the second time the refinery received this particular crude for processing,[8] the largest volume of that crude it ever processed in a year, and the lowest average API gravity (lightest) foreign crude imports it received in any five-months, during 2006 through November 2014. (*Id.*)

10. A report by Sandu and Wright entitled 'Innovative Solutions for Processing Shale Oils' that was published in *Hydrocarbon Processing* during 2013 is appended hereto as Attachment K3-2, and EIA's May 2014 report entitled *U.S. Crude Oil Production Forecast–Analysis of Crude Types* is appended hereto as Attachments K3-3. These reports suggest Bakken crude oil averages ≈ 0.3 wt. % sulfur and 40.8 °API (Att. K3-2) with the density of most Bakken crude oils ranging from ≈ 40–45 °API (Att. K3-3). The 40.8 °API and 0.3 wt. % sulfur averages for Bakken compare to the density (40.1 °API) and sulfur content (0.6 wt. %) of the Russian crude received by Phillips' San Francisco Refinery while it was collecting the measurements it used as the design basis for the project. In terms of these bulk properties, the Russian crude processed by the refinery could be called a 'Bakken look-alike' crude.

11. Bay Area Air Quality Management District (BAAQMD) Application No. 25608 by Phillips 66, dated 31 July 2013, for 'Phase III' of its proposed expansion of wharf capacity to replace dwindling San Joaquin Valley Pipeline (SJVP) crude deliveries to the refinery with waterborne oils from different sources is appended hereto as Attachment K3-4. A chart in this application indicates that the monthly average sulfur content of the refinery crude slate during normal operation from 2004–August 2011 ranged from ≈ 1.8–2.7 wt. %. (Att. K3-4.) The 1.5 million barrels of 0.6 wt. % sulfur crude that the refinery imported from Russia when it was taking the measurements for its project design basis was substantially lower in sulfur than its current crude slate as reported by Phillips 66. At 40.1 °API, this import crude also was substantially lighter than the average density of the refinery's crude slate (≈ 23 °API) estimated during 2008 by previously work.[9] Lighter crude oils, such as this 40.1 °API imported crude and Bakken crude, can be

[8] The only other time during 2006–Nov 2014 was when the San Francisco Refinery received two shipments of Russian crude with these properties in June and July 2010 (Att. K3-1), possibly for a pre-test or previous test run, in the same season a year earlier.

[9] *See* Karras Rodeo Report-1 at 8 (average density in 2008 ≈ 915–918 kg/m^3).

expected to yield substantially more LPG per barrel from distillation, on average, than heavy crude oils, such as those processed at the refinery in the project baseline.

12. Data reported by the industry for dilbit crude streams that are produced in Canada and available for U.S. import are appended hereto as Attachment K3-5. For whole crude, the most recent five-year average densities and sulfur contents reported for these Canadian dilbits ranged from 923–929 kg/m^3 (21.8–20.8 °API) and from 3.5–3.9 wt. %, respectively. (Att. K3-5.) Individual shipments of these dilbits could be expected to range somewhat more widely than these five-year averages.

13. During 2011, the refinery received for processing 153,000 barrels of Canadian crude with a density *and* sulfur content similar to those reported for the Canadian dilbits or denser diluent/bitumen blends (< 24 °API *and* ≥ 2.5 wt. % sulfur). (Att. K3-1.) This 2011 shipment represents a much larger volume of Canadian crude with that range of density and sulfur than the refinery reported receiving and processing in any shipment or any year during January 2006 through November 2014, the first shipment of such crude the refinery reported processing since at least 2005, and the only time since then when the refinery reported processing that crude in this period until 2013. (*Id.*) The only other year since at least 2005 when the refinery received dilbit for processing was 2013 (*Id.*), when, the RFEIR states, Phillips took additional measurements to confirm its project design.

14. Refinery distillation of LPG-rich diluent and cracking of bitumen contained in dilbits can result in LPG yields substantially greater than those from processing the refinery's current baseline crude slate.[10]

15. The refinery has multiple oil storage tanks among which it transfers oils before processing them.[11] Like other refiners, Phillips 66 uses this interconnected storage capacity to advance its processing and business objectives by storing the oils it has received and controlling the timing and amount of each oil it blends into the total feedstock stream processed at the refinery. Thus, the company could have stored the crude it imported from Russia during April–August 2011 for processing in August, when the RFEIR states that the company took the measurements supporting its design basis for the project. Moreover, like other oil companies, Phillips 66 could be expected to measure

[10] *See* my previous comments and expert reports and those of Drs. Fox and Pless.
[11] *See* Attachment K3-4; *see* also BAAQMD 2013 *in* Karras Rodeo Report-1 attachments.

many 'test' oil blends before committing to a major capital project such as this project.[12] In fact, not to do so could risk an unproductive capital investment due to complex and unpredictable interactions of constituents in the new oil blends during future processing, and, from a process design or business perspective, might be considered irresponsible. However, such tests of new oil feedstock blends that appear necessary to establish a valid design basis for the project do not, by definition, represent the typical current baseline feedstock processing conditions.

16. The County could have chosen to estimate the amounts of propane and butane that are recoverable during typical current (2010–2012) conditions based on valid, publicly reported, independently verifiable data. Had it chosen to do so, the County could have required that Phillips 66:

- report each discrete process stream from which LPG would be recovered;
- demonstrate the amounts of LPG it is feasible to recover from each such stream;
- report each discrete measurement of oil feedstock, fuel gas production, and LPG stream quality and quantity in the baseline, including date and time of sampling;
- demonstrate that measurements taken when oil feedstock, processing, or both deviated from typical current baseline conditions (such as in tests done to design the project) are not lumped in with and will not skew the baseline sample data;
- compare the resultant validated baseline data with the proposed project design basis data to support its analysis of potential project impacts, and
- report the supporting data for that comparison and analysis in the EIR.

Unfortunately, the County has not done so, and its the RFEIR has not included, or otherwise provided the public access to, any of these data.

17. Excerpts from a 2014 CEQA review by the City of Richmond for the Chevron Richmond Refinery 'Modernization' Project are appended hereto as Attachment K3-6. The City's EIR for that project included data for baseline as well as anticipated post-project crude and gas oil feedstock density, sulfur content, distillation properties, and feedstock processing rates for processes in the Richmond refinery. (Att. K3-6.) Further, the City of Richmond's CEQA process provided for public access to detailed data, including but not limited to sample analysis results for discrete measurements of various toxic metals in the crude feedstock blends processed by the Richmond refinery as well as the gas oil streams processed by Richmond refinery conversion processing units. (*Id.*)

[12] Those test samples may have included domestically produced Bakken and bitumen, which would not be reported by EIA as foreign imports.

This evidence suggests that the County could choose to include the data necessary to support independently verifiable analysis of project changes in oil feedstock quality, oil feedstock quantity, and process rates, in the EIR for this Phillips 66 project.

18. An 'Incomplete Letter' issued on 22 August 2014 by the Bay Area Air Quality Management District (BAAQMD) to Phillips 66 regarding its 'Phase III' wharf expansion proposal is appended hereto as Attachment K3-7. Among other outstanding questions regarding Phillips' proposal, BAAQMD found that its application to replace additional current SJVP crude supplies to the refinery with waterborne crude oils from different sources was incomplete because "detailed crude oil information pre and post project" is needed. (Att. K3-7.) This evidence further suggests that the County could choose to include baseline and anticipated post-project oil feedstock quality data in the EIR.

19. In my opinion: Phillips 66 has both motive and opportunity to measure samples of the new oil feedstock the company plans to, proposes to, and is investing capital to process at the refinery while the proposed project would be operational. The conclusion in the RFEIR that this 'design basis' data represents current baseline conditions is illogical and its failure to disclose or analyze the baseline, post-project, and design basis feedstock data renders its illogical conclusion unsupported by any evidence. These clear errors in the RFEIR's project description ignore the reasonable potential, documented in previous comments, that significant feedstock-driven impacts on environmental health, safety, and climate protection could result from the project.

20. I have given my opinions on these matters based on my knowledge, experience and expertise and the data, information and analysis discussed in this report.

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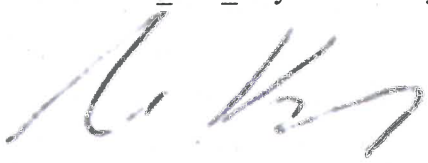
I declare under penalty of perjury that the foregoing is true of my own knowledge, except as to those matters stated on information and belief, and as to those matters, I believe them to be true.

Executed this _**2nd**_ day of February 2015 at Oakland, California



Greg Karras