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# TABLE OF CONTENTS

<b>What is the setting of this case? [Dominic Al-Shamari]</b>	<b>3</b>
<b>What environmental threats from worse case scenarios are there in this setting? What data is available to characterize worse case scenario potential? What other environmental hazards are there in this setting? [Kushal Dave]</b>	<b>6</b>
<b>What factors -- social, cultural, political, technological, ecological -- contribute to environmental health vulnerability and injustice in this setting? [Alicia Martinez]</b>	<b>8</b>
<b>Who are the stakeholders, what are their characteristics, and what are their perceptions of the problems? [Edgar Santana]</b>	<b>10</b>
<b>What have different stakeholder groups done (or not done) in response to the problems in this case? [Brandon Shamoo]</b>	<b>12</b>
<b>How have big media outlets and environmental organizations covered environmental problems related to worse case scenarios in this setting? [Christine Voong]</b>	<b>14</b>
<b>What local actions would reduce environmental vulnerability and injustice related to fast disaster in this setting? [Patrick Yang]</b>	<b>15</b>
<b>What extra-local actions (at state, national or international levels) would reduce environmental vulnerability and injustice related to fast disaster in this setting and similar settings? [Group 1]</b>	<b>17</b>
<b>What kinds of data and research would be useful in efforts to characterize and address environmental threats (related to fast disaster, pollution and climate change) in this setting and similar settings? [Group 1]</b>	<b>19</b>
<b>What, in your view, is ethically wrong or unjust in this case? [Group 1]</b>	<b>21</b>
<b>REFERENCES</b>	<b>22</b>
<b>APPENDIX</b>	<b>26</b>
<b>ABOUT THE AUTHORS</b>	<b>31</b>



Cover Image: Dederling Uwe, *Location of Torrance, California*, August 23, 2010, Wikipedia accessed October 25th, 2019

## 1. What is the setting of this case? [Dominic Al-Shamari]

Incorporated in the 1910's, Torrance is a primarily industrial city situated within the Greater Los Angeles municipal region. Geographically, it is a coastal region, though only a small portion of its incorporated area actually touches the sea, it is mostly inland suburban and industrial developments. Demographically speaking Torrance is liberal leaning, with a population of roughly 150 thousand people resulting in a population density of around 7000 per square mile (U.S. Census, 2018). Demographically, over 4/5ths are of White or Asian descent, while the local hispanic community remains a primary minority in the region (Areavibes 2017). The city of Torrance was listed by state census as the 39<sup>th</sup> largest city in the state of California (Data USA n.d.). Torrance presently experiences an unemployment rate of roughly 3.5%, with about 7% of the local population living below the national poverty line.

The city itself is physically located in close proximity to the warehouse districts in Gardena, alongside the industrial refineries both within Torrance, and those neighboring in Carson and the twin ports of Los Angeles. In addition, the main interstate 405 highway runs through the north side of Torrance. The result of this positioning is a large portion of the local workforce working in industrial or industrial administrative jobs, which provide an average income of roughly \$85,000, putting it in the upper bound of the national mean. Torrance, due to this above average income, boasts an average property value of roughly \$685,000 as of 2017. It is worth noting that this is three times the national average, indicating that both its positioning in the Los Angeles and the large amount of local industry have raised the cost and standard of living in this area. With regard to the healthcare demographics of Torrance, it has been reported that about 94% of local residents have health coverage, with roughly 58% of these people relying on employee benefits, which unfortunately can skew their ability to go against corporate interests.

The city currently hosts the employment of roughly 73,000 people, while total growth in the jobs sector is expected to rise by 34% within the next ten years. Alongside this workforce distribution, the local air quality suffers as a result of the refineries and traffic congestion, and is thus hosts an EPA Superfund location (EPA 2016). EPA EJscreen reports that many EJ indexes are in the upper national percentiles, especially for air quality, which are in the upper 70's and 80's, giving clear evidence of poor regional air quality (EPA 2018). It is worth noting that due to the numerous refineries both within the city and surrounding, it is well within the vulnerability zone of multiple refineries in the event of a worst-case scenario, upping the risk for those who reside and work within the city.

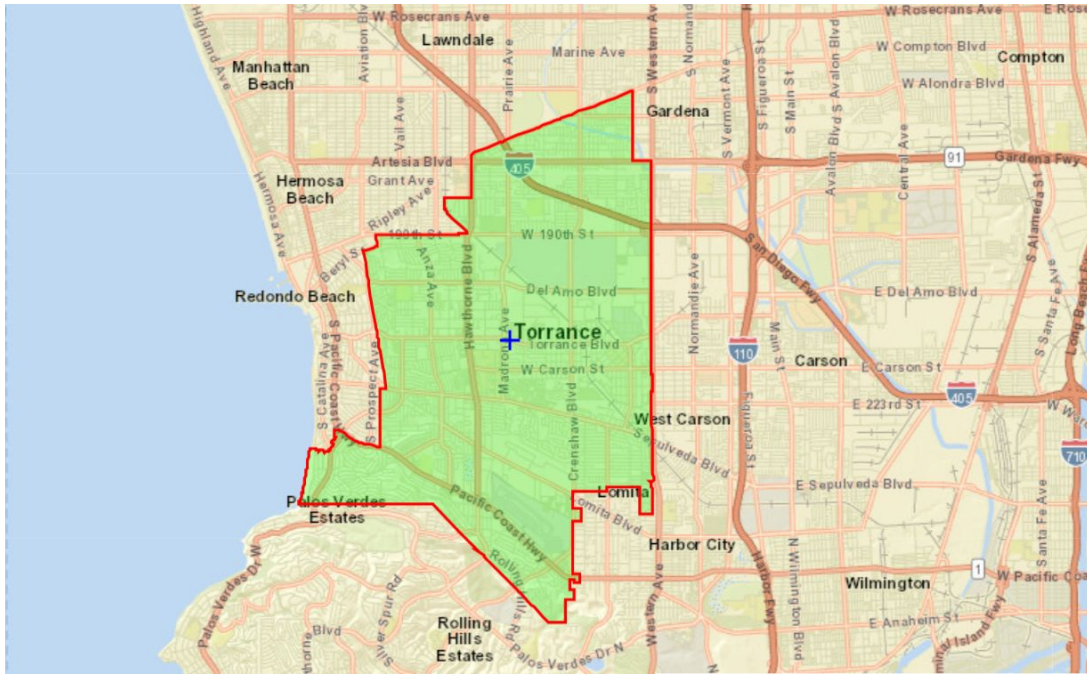


Fig 1: Selected area for the City of Torrance. EPA EJ Screen Report, *City of Torrance*, 2018. Retrieved October 22, 2019. Screenshot taken by Dominic Al-Shamari.

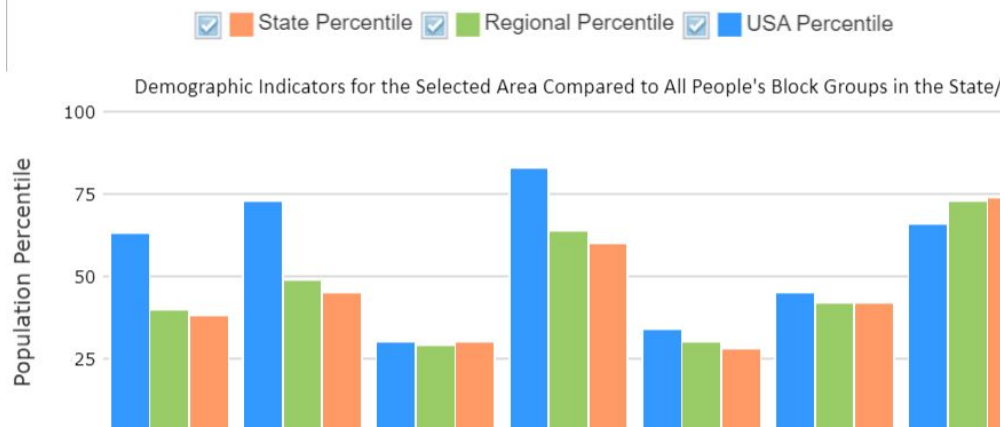
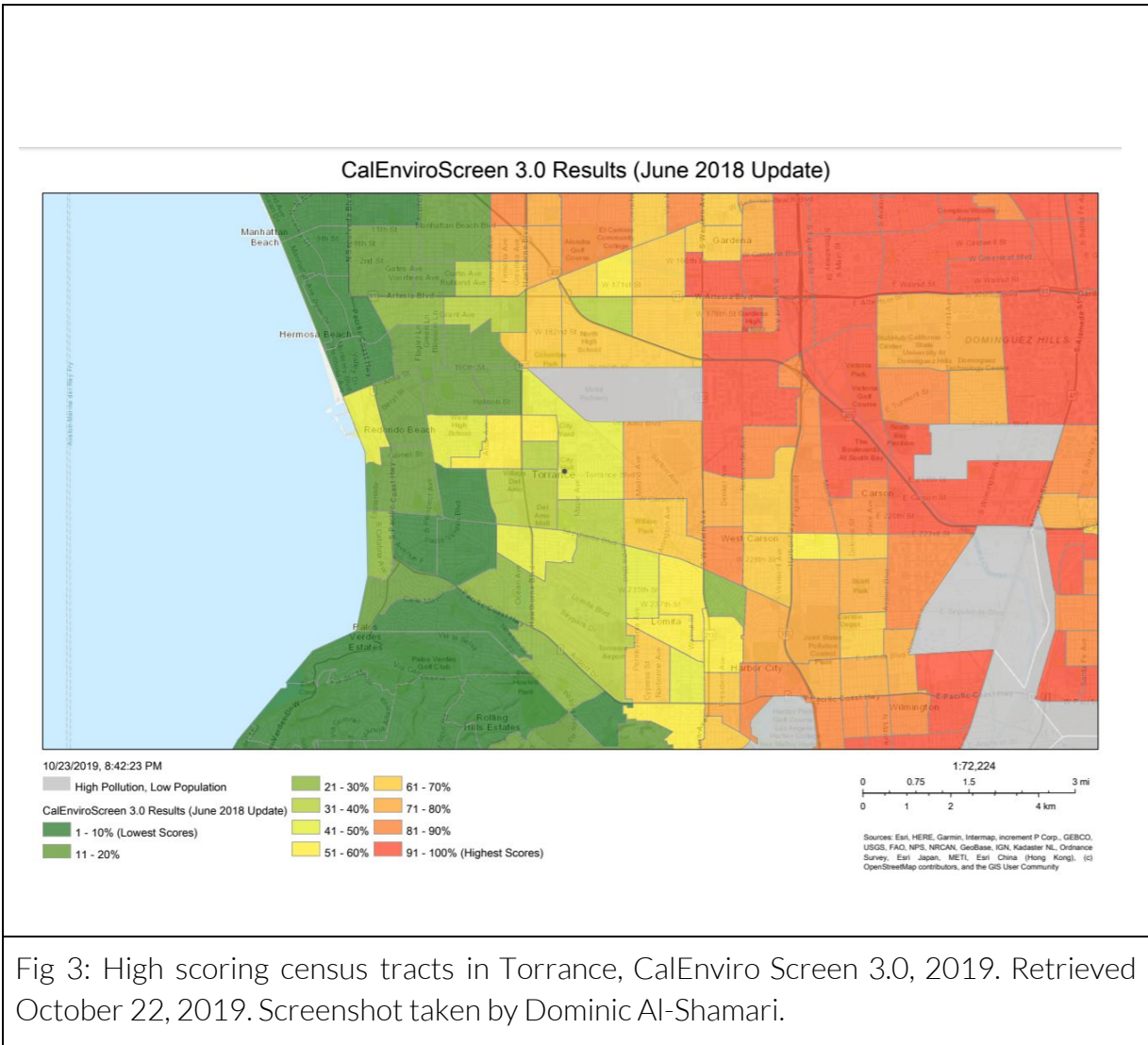


Fig 2: Demographic indicators for Torrance. EPA EJ Screen Report, *City of Richmond*, 2018. Retrieved October 22, 2019. Screenshot taken by Dominic Al-Shamari.





**2. What environmental threats from *worse case scenarios* are there in this setting? What data is available to characterize worse case scenario potential? What other environmental hazards are there in this setting? [Kushal Dave]**

According to the EPA RMP Report, the city of Torrance is likely to be in at least one RMP facility's vulnerable zone. The major refinery in Torrance is the Torrance Refining Company, previously known as ExxonMobil Refinery. The refinery pollutes the earth

with a significant amount of carbon dioxide emission each day. In 2015 they were able to “process an average of 155,000 barrels of crude oil daily and produce 1.8 billion gallons of gasoline per year” (Ohlheiser 2015) demonstrating an incredible carbon footprint that contributes to global climate change. Additionally, an explosion of the refinery like the one in 2015 would cause an immediate distribution of toxic chemicals into the air, reducing the air quality despite the readings still being “within normal range” (Ohlheiser 2015). The aftermath of the previous explosion caused “the air near the blast site [to] smell of sulfur and chemicals” (Groom 2015) which shows a release of chemicals, although the local fire officials claimed that “there was ‘no chemical release’” (Ohlheiser 2015). According to the U.S. Chemical Safety Board, the explosion nearly released acid that could have led to thousands of casualties and injuries in the nearby communities (Green 2019). The refinery also has an issue regarding the chemical modified hydrofluoric acid (MHF). Research conducted by the South Coast Air Quality Management District has shown there is little difference between toxic hydrofluoric acid and modified hydrofluoric acid (MHF) suggesting MHF is just as dangerous. There has been at least five modified hydrofluoric acid leaks in Torrance since the refinery explosion and little to no legal action has been taken (McNary 2019). The chemicals and pollutants the Torrance Refinery uses poses a major threat to the communities and environment in Torrance.

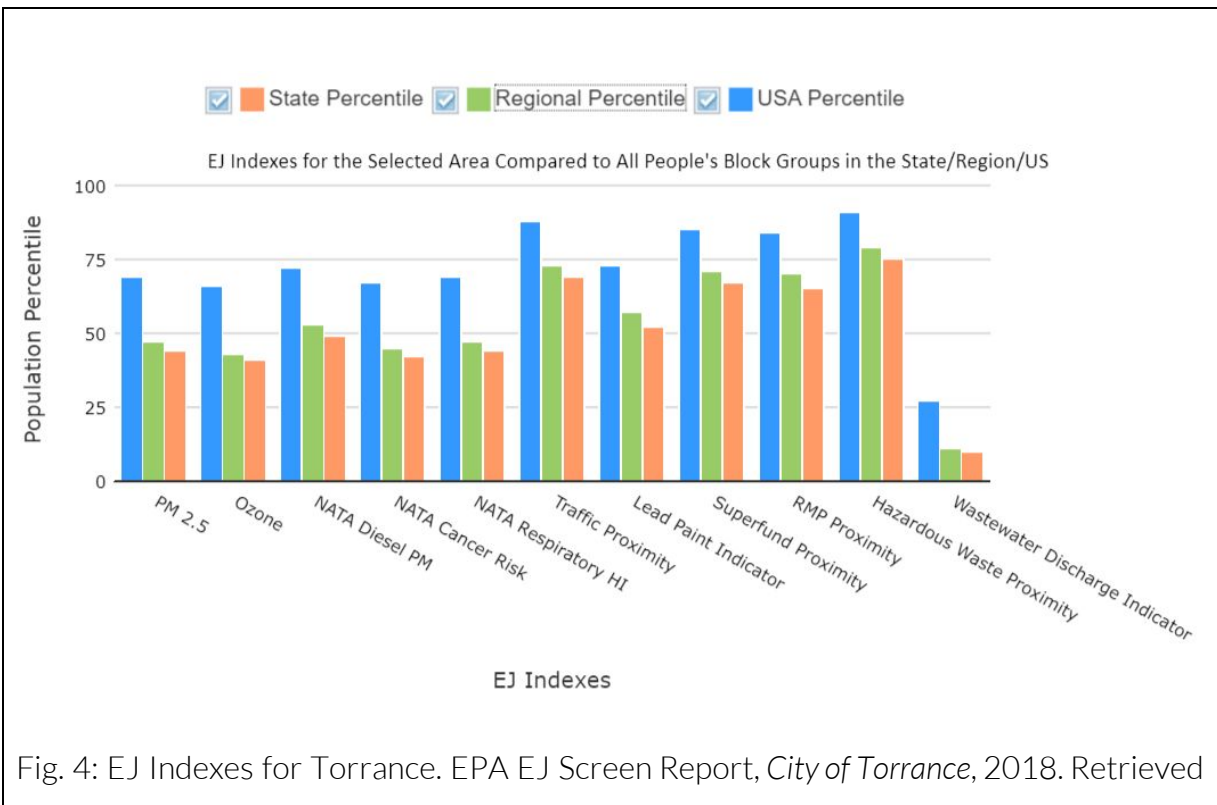


Fig. 4: EJ Indexes for Torrance. EPA EJ Screen Report, City of Torrance, 2018. Retrieved

October 23, 2019. Screenshot taken by Kushal Dave.

The EPA EJ Screen Report illustrates various environmental stressors of Torrance and its comparison with the state of California and the United States as a country. According to Figure 4, Torrance is above the 50th percentile in all categories of the EJ Index except for wastewater discharge indicator. Stressors above the 75th percentile include traffic proximity, superfund proximity, RPM proximity, and hazardous waste proximity, each posing a threat to the well-being of human life.

Other environmental hazards in Torrance include flooding potential in the future in response to climate change. In the past decade, there has been a dramatic increase in coastal flooding in the past decade due to climate change caused by humans. The risks of flooding likely to occur above six feet in Torrance is over 80% in 2090 and almost 100% in 2100 (Surging Seas Risk Finder). Although this may seem a ways away, climate change is not improving as the Torrance Refining Company also contributes to the issue. This could speed up the process, endangering those living in Torrance and the environment as well.

### **3. What factors -- social, cultural, political, technological, ecological -- contribute to environmental health vulnerability and injustice in this setting? [Alicia Martinez]**

In the City of Torrance the census tract that scores the highest in the CalEnviroScreen's index is 6037650901 with a score of 75-80% (August 2018) however it is important to note that no score is provided for the census tract in which the Torrance Refinery is located due to the fact that it has "low population" or "unreliable health data" yet the information that is provided for this census tract places them in the 96 percentile for pollution burden, in the 99.81 percentile for toxic releases, and in 95.05 percentile for groundwater threats. The toxic release from facilities (Fig. 5) identifies approximately 16 sites of toxic release sites in the City of Torrance, most of which are in the census tracts near the Torrance Refinery ("California Healthy Places Index Map" 2018). The Los Angeles County Department of Public Health, City and Community Health Profiles, Torrance identified 1,154 oil and gas wells in Torrance, which puts residents at risk of exposure to toxic chemicals.

Both the exposure to environmental hazards and accessibility to health care varies from



census tract to census tract. According to the Health Places Index, the City of Torrance “has healthier community conditions than 79.5% of other Californian cities” and “has healthier healthcare access conditions than 76.7% of other Californian cities”(“California Healthy Places Index Map” 2018). Yet the census tract that is closer to the refinery “has a healthier community conditions than 66.3% of other California census tracts, “has healthier healthcare access conditions than 44.5% of other California census tracts” and “ has healthier clean environment conditions than 49% of other California census tract.”(“California Healthy Places Index Map” 2018) . The City and Community Health Profiles of Torrance also reported that 4% of minors and 13% of adults are uninsured in Torrance and 16% of adults reported difficulty accessing healthcare. Having a high percentage of people who are uninsured or have difficulty accessing healthcare, leads to vulnerability as those who get sick may have no way to seek treatment. Torrance also has 181.1 newly diagnosed cases of breast cancer per 1000 population and 10.2 suicides per 1000 population both of which is higher than Los Angeles county. (“LA County Department of Public Health” 2018)

Limited access to recreational spaces and health food also impacts the health of a community. The City and Community health profiles of Torrance reports that Torrance has 1.98 acres per 1,000 population in available recreational spaces which is lower than Los Angeles county which has 8.10 acres per 1,000 population (LA County Department of Public Health 2018). Only 33% of adults in Torrance are meeting the recommended guidelines for physical activity. Torrance also has a 17% rate of obesity among adults and 8% of adults with diabetes. Torrance has 2 farmers market and neither of them accept EBT or WIC, this limited the availability of fresh fruit and vegetables to low income households who may be struggling with food insecurity.

One of the factors that contributes to the environmental health vulnerability and injustice in Torrance is the big impact that the Torrance Refinery has on the economy of Torrance “About 80 of the refinery’s and receive employees reside in [Torrance] and receive \$11 million in wages annually” and all together “ the Refinery supports 326 jobs and \$30 million in wages in the City of Torrance” (Williams 2017).

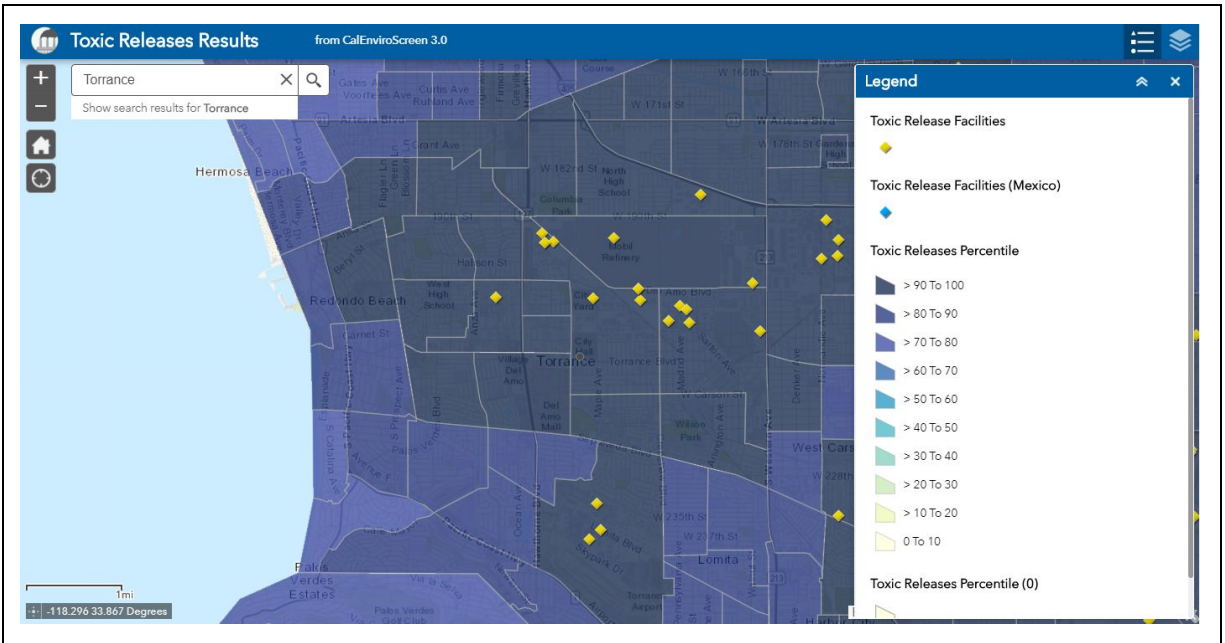


Fig. 5: Map shows the sites of toxic release in Torrance, most of these sites are near the Torrance Refinery. Toxic Releases Results. CalEnviroScreen3.0, City of Torrance, 2018. Retrieved October 23,2019. Screenshot taken by Alicia Martinez.

#### 4. Who are the stakeholders, what are their characteristics, and what are their perceptions of the problems? [Edgar Santana]

The stakeholders in this case are the nearby neighborhood community, the Torrance Refinery, PBF Energy, local the refinery workers, students, California Division of Occupational Safety and Health. The nearby neighborhood community is predominantly well-educated, either involved in technical professions or healthcare (Torrance, CA Education, n.d.; Torrance, CA Economy, n.d.). The nearby neighborhood community's perception of the refineries are apprehensive, most of which have actively voiced bans of chemicals from previous refinery leaks (McNary 2018).

Another stakeholder is the Torrance Refinery, formerly owned by Exxon, which produces 155,000 barrels per day and employs over 500 workers (Torrance Refining Company 2019). Their position on past public concerns have been largely bureaucratic, issuing blanket public statements that attempt to reassure that any reprimands handed down by Cal/OSHA are taken seriously and that "appropriate administrative and legal

next steps" are taken (Rocha 2015).

The owner of the Torrance Refinery, PBF Energy is also a stakeholder in this case. They are one of the largest producers of what they call 'unbranded' fuels, with a combined total *throughput* of 9,000,000 barrels per day (PBF Energy 2019). Their position on problems concerning the Torrance Refinery, much like the official statements issued by the refinery itself, is largely bureaucratic. PBF officials admit that highly toxic chemicals are used at this refinery, however, they claim an additive reduces the hazard in the event of a leak; furthermore, the officials cite "economic infeasibility" for reasons why a ban of the chemical is not an option (Valdez 2018).

The refinery workers are another important stakeholder to take into account in this case. They comprise over 500 highly skilled workers, with addition to anywhere between 300 and 500 contractors on-site on a daily basis (Torrance Refining Company 2019). Their perspective on the problems may either be apathetic, since they have ran the facility blind to regulations in the past, or their perspective may be acknowledging of the matters, however, they may be inhibited to speak out against the company for fear of losing their jobs (Friel 2017).

Local students comprise the local K-12 Torrance Unified School District, as well as nearby city colleges. The students are well aware of the problems that can occur with the Torrance Refinery and their perceptions to the refinery and parent company are problematic and untrusting due to past history of refinery explosions in Torrance. In 2015, the school district was ordered to shelter in place because of concerns over air quality ("Explosions at Exxon" 2015).

California Division of Occupational Safety and Health is governing agency that maintains health and safety standards in the workplace throughout California; their perceptions to refineries in close proximity are also apprehensive due to past refinery negligence that resulted in toxic leaks. In 2015 Cal/OSHA issued 19 citations to Exxon Mobil, where most of them were deemed "serious" by the agency ("Exxon Mobile Fined" 2015).



Fig. 6: Gaverson Brad, An explosion in February crippled Exxon Mobil's refinery in Torrance, January 13th, 2016, Los Angeles Times, accessed October 25th, 2019.

### **5. What have different stakeholder groups done (or not done) in response to the problems in this case? [Brandon Shamoo]**

The main stakeholder groups affected by the Torrance Refinery incidents include the Torrance Refining Co., Torrance Refinery Action Alliance (TRAA), and local residents, students, and county officials. Each one of these groups have taken different actions to help address and fix the effects that the Torrance Refinery has on the community. One of the leading stakeholders in this situation is the Torrance Refining Co. itself. The main action that the refining company takes to deal with the effects of an accident or flaring events is to support the local community. In a letter sent to a chair member of the SCAQMD, the Torrance Refinery manager talks about the company's commitment to supporting the community through sponsorships and benefit programs (Steach 2017). For example, a couple weeks after SCAQMD voted against stronger safety procedures regarding MHF in 2019, the Torrance Refinery sponsored a local sports team and a golf tournament for kids to be sent to summer camps (Torrance Refinery 2019). Supporting schools and residents is a common tactic for large corporations to gain trust and support

from the local community. This action also influences community members to vote for the refining company because without the local's support, the refining company may stop sponsoring them. Directly opposing the Torrance Refining Co. is the Torrance Refinery Action Alliance. Formed after the refinery explosion back in 2015, the TRAA is a volunteer organization comprised of residents and business owners. Their goal is to raise awareness and stop production of a highly toxic chemical called modified hydrofluoric acid, or MHF (TRAA 2015). The TRAA holds meetings twice a month to discuss the current issues dealing with the local refinery. To directly support their movement, the TRAA asks those interested to send in donations and sign a petition in favor of banning MHF production in California refineries (MODIFIED 2016). Arguably the most affected out of all the stakeholders are the residents and students neighboring the refinery. In 2017, Residents and county officials of Torrance took matters into their own hands by holding a conference to discuss matters regarding the safety hazards of the Torrance Refinery (Khan 2017). During the meeting, county officials stated that the danger potential from these chemicals should be taken seriously and that safety should be the Torrance Refinery's main priority. (Khan 2017) These meeting, especially with county officials, are essential for raising public awareness on the dangers of refinery air pollution on local communities.



Fig. 7: Casillas Robert, Volunteers for TRAA warning communities about the dangers of modified hydrofluoric acid, November 1st, 2017, *Daily Breeze*, accessed October 25th, 2019.



## **6. How have big media outlets and environmental organizations covered environmental problems related to worse case scenarios in this setting? [Christine Voong]**

In February 18, 2015, an explosion occurred at an oil refinery in Torrance, California. Many news reports, such as the LA Times and Daily Breeze, described the impacts the explosion caused for the workers and the community. With the assistance of the news media, the incident has many concerns about the use of dangerous chemicals. The Torrance Refinery Action Alliance (TRAA) is an organization of residents who resides near the Torrance refineries whose work together to ban the use of MHF (modified hydrofluoric acid), a harmful chemical used in the refinery, to improve the public health of the community. Sally Hayati, president of the TRAA, held a workshop, hosted by Mayor Furey, to educate and inform the community of the chemicals used in the refinery and the potential dangers that can be imposed if a natural disaster or malfunction within the refinery were to occur. Educating the community provides the power and knowledge to take initiative to work together to fight for the safety of their community as more members are showing concern for their [TRAA] cause.

Expressing the organizations dedication to their case, Sally exclaimed in her letter to the mayor that “the anger heard from a few individuals at the workshop comes from valid concerns, aggravated by the city’s lack of response and promotion of discredited safety claims made by the refinery for modified hydrofluoric acid (MHF). Your continued declarations that the 1990 Torrance-Mobil Consent Decree binds the city’s hands and that Torrance (being merely a city) is helpless to act are wholly unconvincing (Hayati 2017).” Lacking resolution from authority figures and another explosion two year after the 2015 accident encouraged the TRAA members and the community to step up and take action.

After another facility accident in February 18, 2017, the Torrance Refinery Action Alliance knew that they cannot stay silent and trust the refinery to make any relevant changes. The organization, along with approximately 300 supporters, went to the streets to protest against the use of MHF. The South Coast Air Quality Management District also became involved in their [TRAA] cause. William Burke, chairman of the SCAQMD, exclaimed, “Residents have suffered too long from excess air pollution due to preventable flaring, not to mention fear of the next potential accident at the refinery . . . At our upcoming hearing, we will discuss steps that the refinery should take now to reduce these potentially harmful incidents (Mendez, 2017).” A plan to form a bill to ban



MHF was discussed, but similar bills in the past was deceased. In addition, the Torrance Refinery Company ensured the SCAQMD that an additive was added to MHF to make it safer and they operate many other safety measures. However, the community does not intend to let another incident occurs.



Fig 8: Smith Jeffery, *Smoke is seen after an explosion at the ExxonMobil refinery in Torrance, May 3rd, 2017, ABC EyeWitness News, accessed October 26th, 2019.*

**7. What local actions would reduce environmental vulnerability and injustice related to fast disaster in this setting? [Patrick Yang]**

Although the local authorities at Torrance during the explosion did an excellent job in informing their residents and local schools about the disaster, much more local action could prepare the people for the occurrence of such an accident. In our modern society, the idea of shutting down a company's operation is extremely difficult, especially if the target corporation is that in the petrochemical industry as gasoline is used in our everyday transportation. Despite this difficulty, local authorities should provide an evacuation plan or a list of safety procedures with periodic training days and drills to ensure the safety of the citizens in the community.

As the definite first step of the process of reducing risk related to fast disasters, local authorities should create a ranking method to determine the significance of each potential disaster and develop the evacuation and safety precaution plans accordingly. Using these methods, the locals would be better prepared and aware of the appropriate procedures during a catastrophe, reducing the number of casualties and injuries. Furthermore, after these evacuation plans and safety precautions have been established, the local government needs to practice these routines to ensure that the residents and workers in the area understand the gravity of the situation when an unforeseen calamity was to occur at any time. Preparation prior to the major catastrophe would be able to reduce the devastating effects as the citizens would be able to evacuate or remain safe when the disaster occurs rather than being oblivious to the immediate perils from the worst-case scenarios. In preventing the damage from the disaster, an announcement that "the most important thing is to shelter in place, stay indoors, no outdoor activity, turn the air conditioners off, keep the windows closed" (Groom 2015) was able to protect the locals. However, to encourage preparedness before a disaster comes, drills should be enforced to ensure the safety of the locals. This simple and reasonable approach should be the highest priority as it protects the people and secures the citizens from any harm.

Another paramount factor in promoting the protection of the people is to educate the locals such as workers and students about the perils of inhabiting an area near a worst-case potential. The "students at 14 schools near the refinery [who] were ordered to shelter in place because of concerns over air quality" (Groom 2015) should be informed about the proper procedures to follow when met with such a disaster. Since any form of disaster with this refinery would directly impact the students, it would be beneficial to educate students about these potential worse case scenarios. Additionally, education would help nurture future generations to gain the understanding in regards to the methods to prevent such disasters from occurring and would provide as an assurance for the safety of future generations.

Finally, creating an alliance dedicated to voicing their opinions by contacting a series of different organizations and people with the authority to change these actions. The Torrance Refinery Action Alliance helps with the process of contacting local corporations and officials and, furthermore, urges their followers to do the same and offering suggestions such as “submit[ting] a letter to the editor [or] speak at a Torrance City Council Meeting” (Torrance Refinery Action Alliance 2019). This method would allow people to express their feelings of discomfort towards any legislations or practices within their communities and voice their opinions about the appropriate plans of action towards the subject matter. Having multiple inputs from people of different backgrounds could catalyze the environment and economy of the communities and aid the lawmakers to initiate legislation to abolish environmental injustice.



Fig 9: Nick Ut, The aftermath of the explosion at the ExxonMobil Refinery displaying the destruction at the site, February 18th, 2015, *The Washington Post*, accessed October 26th, 2019.

**8. What extra-local actions (at state, national or international levels) would reduce environmental vulnerability and injustice related to fast disaster in this setting and similar settings? [Group 1]**

In Torrance, California, one of the biggest issues deals with the Torrance Refining Company. The refinery was acquired by the parent company PBF Energy in 2016 from ExxonMobil (Torrance Refining Company). In 2015, the refinery had eight safety and workplace violations which resulted in an explosion and fire that destroyed the refinery. In order to take accountability, ExxonMobil paid \$566,600 to California's Division of Occupational Safety and Health (Green 2019), however, this is a small percent of the money they make and does not really hurt the company. Even agreeing to settle, the company stated there was no risk to the community (Penn 2017). However, the U.S. Chemical Safety Board found the explosion was very close to releasing an acid which would have resulted in large amounts of casualties and injuries in the nearby communities (Green 2019). A federal agency explained how ExxonMobil was using old equipment not safe to operate and obsolete procedures (Penn 2017). Although PBF Energy has invested around \$800,000 for employee training and upgrades, there still lies a risk that a catastrophe could happen again and cause unnecessary harm to the community (Green 2019).

In order to prevent future disasters from occurring, the government needs to implement harsher regulations and enforce them in order to keep these larger companies in check. Background checks should be done regularly and prioritized in order to make sure companies are operating within the rules of regulation. To prevent companies from acting carelessly, harsher fines should also be implemented if the companies are found to not comply with the regulations. Although some may argue this would increase the costs of the people through taxes in order to fund these background checks, the lives of the people are more important than slight tax increases.



Fig 10: Popov Andrey, *Form Requesting for Background Check*, October 21st, 2018, Business News Daily accessed October 26th, 2019

**9. What kinds of data and research would be useful in efforts to characterize and address environmental threats (related to fast disaster, pollution and climate change) in this setting and similar settings? [Group 1]**

It is very difficult to prevent and lower the air pollution in areas at Torrance that contains oil refineries. However, with the proper data and research, communities (and possibly local government) can implement counter measures to reduce exposures to such dangerous pollutants. It is already known that Torrance Refining Company uses dangerous chemicals such as modified hydrofluoric acid (McNary 2019). Understanding the production procedures and the waste produced can help recognize the potential danger the refinery can impose onto the community and what symptoms can be caused by such chemical exposure. The public should also be aware of any external signs, such as a certain smell or color of the clouds, that alerts them of a chemical accident in case

they are not given proper warning from the officials. Research should be done making sure people in potentially affected communities are aware of the signs to guarantee the most possible protection for them. In addition to that, the public should be informed of what to do in case of an emergency. For the meantime, obtaining data through monitoring the air quality can indicate which days facility pollution is heavy. The Torrance refinery plans to “provide the public with monitoring results in a manner that provides meaningful information to help understand the refinery’s contribution to air quality in nearby communities (Green 2017).”



Fig 11: *Power outage causes “flaring” burnoff at Torrance oil refinery, October 15th, 2016, Prima News accessed October 26th, 2019*



**10. What, in your view, is ethically wrong or unjust in this case?  
[Group 1]**

The major things ethically wrong and unjust with this case is the greed of the refining company, the lack of changes implemented, and how little punishment the company would likely face if a disaster occurred. It has already been seen how small the punishment ExxonMobil faced in regards to the 2015 Torrance Refinery explosion (Green 2019). The greed the major companies that own the refinery have needs to be demonstrated throughout the communities to show to people these companies care more about profits rather than switching to safer alternatives. Rather than providing the proper precautionary measures and safety techniques to reduce the likelihood of another disaster, the companies would prefer to save a few extra dollars. Luckily, there is a grassroots group called Torrance Refinery Action Alliance (TRAA) formed after the ExxonMobil explosion fighting to ban modified hydrofluoric acid (Torrance Refinery Action Alliance). The South Coast Air Quality Management District performed a study and found hardly any difference between toxic hydrofluoric acid and modified hydrofluoric acid (MHF) illustrating the dangers of MHF. At least five modified hydrofluoric acid leaks in Torrance have occurred since the ExxonMobil explosion in 2015 demonstrating insufficient changes in procedures and protocols by the refining company and little to no legal action has been taken (McNary 2019). Understanding the magnitude of the potential harm that could occur and having no punishment, even after multiple leaks is ethically wrong and unjust. Although TRAA is fighting, more work needs to be done before any significant change can occur to keep the communities in Torrance protected.



Fig 12: Kandel Jasont, *ExxonMobil Refinery Explosion*, February 18th, 2015, NBC Los Angeles accessed October 25th, 2019

## REFERENCES

Areavibes. 2017. "Torrance, CA Population & Demographics." 2017. <https://www.areavibes.com/torrance-ca/demographics/>.

Associated Press. 2016. "Report on 2015 Torrance Refinery Blast to Be Unveiled Today - Los Angeles Times." January 13, 2016. <https://www.latimes.com/business/la-fi-torrance-refinery-20160113-story.html>.

August, Laura. 2016. "CalEnviroScreen 3.0." Text. OEHHA. December 29, 2016. <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30>.

BestPlaces. 2012. "Torrance, California Economy." Best Places. 2012. <https://www.bestplaces.net/economy/city/california/torrance>.

BestPlaces. 2012. "Torrance, California Education." Best Places. 2012.  
<https://www.bestplaces.net/education/city/california/torrance>.

"California Healthy Places Index." n.d. Accessed October 26, 2019.  
<https://healthyplacesindex.org/>.

Caramela, Sammi. 2018. "How to Handle Background Checks When Applying for Jobs." October 21, 2018.  
<https://www.businessnewsdaily.com/11102-fixing-misinformation-background-checks.html>.

Data USA. 2018. "Torrance, CA." 2018.  
<https://datausa.io/profile/geo/torrance-ca/#about>.

Green, Nick. 2017. "Torrance Group Launches Public Outreach over Refinery Dangers – Daily Breeze." November 1, 2017.  
<https://www.dailybreeze.com/2017/11/01/torrance-group-launches-public-outreach-over-refinery-dangers/>.

Green, Nick. "Air Quality Data Shows Pollution from Torrance Refinery Far Higher than Others in Southern California." Daily Breeze, September 6, 2017  
<https://www.dailybreeze.com/2017/03/01/air-quality-data-shows-pollution-from-torrance-refinery-far-higher-than-others-in-southern-california/>

Green, Nick. 2019. "ExxonMobil Settles over 2015 Torrance Refinery Blast." Daily Breeze. February 2, 2019.  
<http://www.dailybreeze.com/exxonmobil-settles-over-2015-torrance-refinery-blast>.

Gregory, John. 2017. "2015 Torrance Refinery Explosion Was Preventable, Board Says | Abc7.Com." May 3, 2017.  
<https://abc7.com/news/2015-torrance-refinery-blast-was-preventable-board-says/1949420/>.

Groom, Nichola. 2015. "Explosion at Exxon Mobil Refinery in Torrance, California, Injures Four." Reuters, February 18, 2015.  
<https://www.reuters.com/article/us-refinery-blast-exxon-idUSKBNOLM1VR20150218>

Friel, Courtney. 2017. "Exxon Mobil's Outdated Procedures, Old Equipment Led to 2015 Torrance Refinery Explosion: Federal Report." May 3, 2017.

<https://ktla.com/2017/05/03/final-report-on-investigation-into-2015-torrance-refinery-explosion-released/>

Hayati, Sally. 2017. "Torrance Refinery Action Alliance." Torrance Refinery Action Alliance, August.

<https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1410/1410-comment-letters/traa-2017-08-14-torrance-refinery-workshop-aug-5.pdf?sfvrsn=6>.

Kandel, Jason. 2015. "Refinery Explosion Rocks Torrance - NBC Southern California." February 18, 2015.

<https://www.nbclosangeles.com/news/local/Refinery-Explosion-Rocks-Torrance-292419751.html>.

Khan, Amina. 2017. "Torrance Officials and Residents Call for Ban of Refinery Chemical - Los Angeles Times." Los Angeles Times. April 1, 2017.

<https://www.latimes.com/local/lanow/la-me-ln-torrance-refinery-20170401-story.html>.

LA County Department of Public Health. 2018. "LA County Department of Public Health." October 16, 2018.

<http://publichealth.lacounty.gov/ohae/cchp/healthProfilePDF.htm>.

McNary, Sharon. 2019. "Two SoCal Refineries Will Continue To Use Chemical That Can Turn Into A Toxic Cloud. For Now At Least: LAist." January 30, 2019.

<https://laist.com/2019/01/30/modified-hydrifluoric-acid-sothern-california-refineries.php>.

McNary, Sharon. 2018. "AQMD Panel Wants Safety Measures, but No Ban, to Cope with Hazardous Refinery Chemical | 89.3 KPCC." April 30, 2018.

<https://www.scpr.org/news/2018/04/30/82649/aqmd-panel-wants-safety-measures-but-no-ban-to-cope/>.

Mendez, David. 2017. "Hundreds March on Torrance Refinery Calling for MHF Ban." February 24, 2017.

<https://easyreadernews.com/hundreds-march-torrance-refinery-calling-mhf-ban/>.

Change.org. 2016. "Petition · Take Action to Ban Hydrofluoric Acid in CA Refineries." 2016.

<https://www.change.org/p/jerry-brown-don-t-let-exxon-mobile-wipe-out-torrance-ca>.

Ohlheiser, Abby. 2015. "'Large Fire Explosion' Rocks ExxonMobil's Torrance Refinery in California." Washington Post. February 18, 2015. <https://www.washingtonpost.com/news/post-nation/wp/2015/02/18/large-fire-explosion-rocks-exxonmobils-torrance-refinery-in-california/>.

PBF Energy. 2019. "Company | PBF Energy." 2019. <https://www.pbfenergy.com/company>.

Penn, Ivan. 2017. "Exxon Mobil's Outdated Equipment and Procedures Led to Torrance Explosion, Agency Says." Los Angeles Times. May 3, 2017. <https://www.latimes.com/business/la-fi-exxon-mobil-refinery-20170502-story.html>.

Primanews. 2016. "AQMD Cites Torrance Refinery, Saying Gas Flares Caused Air Pollution - PRIMA NEWS." October 15, 2016. <http://www.primanews.org/2016/10/aqmd-cites-torrance-refinery-saying-gas-flares-caused-air-pollution/>.

Public Health Alliance of Southern California. 2018. "California Healthy Places Index Map." 2018. <https://map.healthyplacesindex.org/>.

Rocha, Veronica. 2015. "Exxon Mobil Fined \$566,600 for Torrance Refinery Explosion." Los Angeles Times. August 13, 2015. <https://www.latimes.com/local/lanow/la-me-ln-exxon-mobil-refinery-explosion-20150813-story.html>.

Steach, Steve. "AQMD." AQMD, April 17, 2017. <http://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1410/1410-comment-letters/torc-041718.pdf?sfvrsn=6>.

Surging Seas. 2016. "Surging Seas: Risk Finder." 2016. [https://riskfinder.climatecentral.org/place/torrance.ca.us?comparisonType=place&forecastType=NRC\\_High&level=6&unit=ft](https://riskfinder.climatecentral.org/place/torrance.ca.us?comparisonType=place&forecastType=NRC_High&level=6&unit=ft).

Torrance Refinery. "About Us." Torrance Refinery, October 2, 2019.

<https://torrancerefinery.com/archivearticles/>.

Torrance Refinery Action Alliance. 2019. "How You Can Help." 2019. <https://www.traasouthbay.com/how-you-can-help/>.

Torrance Refining Company. 2019. "About Us - Torrance Refinery." 2019. <https://torrancerefinery.com/about-us-2/>.

TRAA. "About TRAA." Torrance Refinery Action Alliance, 2015. <https://www.traasouthbay.com/traa-fights-mhf-oil-refineries/>.

U.S. Census Bureau. 2018. "U.S. Census Bureau QuickFacts: Torrance City, California." 2018. <https://www.census.gov/quickfacts/torrancecitycalifornia>.

U.S. EPA, 2016. "Superfund Region 9: Southern California." EPA. Accessed October 22, 2019. <https://archive.epa.gov/region9/socal/web/html/index-7.html>.

U.S. EPA. 2018. "EJSCREEN." EPA EJScreen. 2018. <https://ejscreen.epa.gov/mapper/>.

Valdez, Jonah. 2018. "Leak Reported at Torrance Refinery; No Storm Drains; Waterways Affected." December 22, 2018. <https://www.dailybreeze.com/2018/12/22/leak-reported-at-torrance-refinery-hazmat-crews-investigating/>

Wikipedia. 2019. "Torrance, California - Wikipedia." October 21, 2019. [https://en.wikipedia.org/wiki/Torrance,\\_California](https://en.wikipedia.org/wiki/Torrance,_California).

Willams, Brad. 2017. "Economic Impacts of the Torrance Refining Company LLC Torrance Refinery." Torrance Refining Company LLC. [https://torrancerefinery.com/wp-content/uploads/2018/01/TORC\\_Torrance\\_Refinery\\_Economic\\_Impact\\_8-24\\_FINAL.pdf](https://torrancerefinery.com/wp-content/uploads/2018/01/TORC_Torrance_Refinery_Economic_Impact_8-24_FINAL.pdf).

## APPENDIX



CHOOSING A COMMUNITY SKETCH		
Resources: <a href="#">Who's in Danger?</a> // <a href="#">California Fact Sheet</a> // <a href="#">CalEnviroScreen 3.0</a>		
Questions to Consider:	Community 1: Torrance	Community 2: Mead Valley
<i>Does the community's Wikipedia page give any clues to worse case scenarios? Are there hazardous industries? (Look in the economy section)</i>	Yes, it's a major oil-producing region. - Easy access to ports	none
<i>Are there local environmental groups in this community? (Possible search term: environmental justice)</i>	Yes, Alliance Environmental Group, LLC	CCA EJ
<i>According to the <a href="#">EPA</a>, is this location likely to be in at least 1 RMP vulnerability zone?</i>	Yes	Yes
<i>What is the RMP potential in EPA EJ Screen?</i>	Measured from a 3 mi radius at the center of the city: USA percentile: 86 State percentile: 92	USA percentile: 67 State percentile: 54
<i>Is the community listed in either of these resources? <a href="#">Who's in Danger?</a> (starting on page 59) // <a href="#">California Fact Sheet</a></i>	Yes, listed on both	Yes, listed on "Who's in Danger?"
<i>According to the American Lung Association, is the community's <a href="#">state of air</a> rating?</i>	F rating	F rating

**Caption: Appendix 1: Choosing a Community Sketch**

COMMUNITY FAST FACTS SKETCH	
Fast Disaster Community: <b>Torrance</b>	
<i>Setting the scene</i> Conduct a "quick" Google search for fast facts about your community: What is the landscape? How densely populated? Main industries? Overall wealth of the region? Brief history? Find quick resources/articles about the community: Recent news? What are the environmental groups? Environmental News? Community vulnerabilities?	
Google Search	News Resources
Fast Facts:  147,000 people  4% unemployment rate  Estimated median household income: \$85,710  Mediterranean climate, 20 miles away from LA  Founded in 1912	Links: <a href="http://worldpopulationreview.com/us-cities/torrance-ca-population/">http://worldpopulationreview.com/us-cities/torrance-ca-population/</a>  <a href="https://www.bestplaces.net/economy/city/california/torrance">https://www.bestplaces.net/economy/city/california/torrance</a>  <a href="http://www.city-data.com/city/Torrance-California.html">http://www.city-data.com/city/Torrance-California.html</a> <a href="https://www.bestplaces.net/economy/city/california/torrance">https://www.bestplaces.net/economy/city/california/torrance</a>  <a href="https://en.wikipedia.org/wiki/Torrance,_California#Geography">https://en.wikipedia.org/wiki/Torrance,_California#Geography</a>  <a href="https://www.u-s-history.com/pages/h2573.html">https://www.u-s-history.com/pages/h2573.html</a>

**Caption: Appendix 2: Community Fast Facts Sketch**

10/26/2019

Gmail - Re: Form submission from: Risk Management Plan Rule Vulnerable Zone Indicator System form



Kushal Dave <kdave98@gmail.com>

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**Re: Form submission from: Risk Management Plan Rule Vulnerable Zone Indicator System form**

1 message

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rmprc <rmprc@epacdx.net>  
To: EPA <kdave98@gmail.com>

Thu, Oct 24, 2019 at 6:08 AM

**U.S. Environmental Protection Agency**  
**Chemical Emergency Preparedness and Prevention Office**  
RMP Vulnerable Zone Report

\*\*\*\*\*  
**PLEASE DO NOT REPLY**  
\*\*\*\*\*

You asked us if the address or location referenced below is likely to be in a vulnerable zone of a potential accidental release based on reports filed by a facility under the Environmental Protection Agency's Risk Management Program. Here is your reply:

**You Submitted**  
**Address:**  
3700 W 190th Street  
Torrance, CA 90504

**Caption: Appendix 3: EPA RMP Report Part 1**

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Important Information on Latitude/Longitude:

Latitude is the distance of a facility north or south of the equator measured in degrees. Longitude is the distance of a facility east or west of the prime meridian measured in degrees.

The facility latitude and longitude values were obtained from EPA's Facility Registry and may reflect corrections to the latitude and longitude submitted by the facility.

Facility latitude and longitude used by VZIS may not duplicate the latitude and longitude used by the facility during the preparation of their Off-site Consequence Analysis. Some facilities may have used points that reflect the chemical storage area of their facility. EPA used the latitude/longitude points in EPA's Facility Registry to standardize VZIS operation.

RMP facility information used for this search was last updated in September 2019.

Because websites use various methods and data sources to determine latitude/longitude values, values may differ among websites.

<b>Latitude:</b>	<b>Longitude:</b>
33.855478	-118.323209

**Results:**

The EPA's Vulnerable Zone Indicator System shows that the location you submitted is **likely to be** in at least one RMP facility's vulnerable zone.

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Local Emergency Planning Committees (LEPCs) are your community's chemical safety experts!

LEPCs develop and review your community's chemical emergency response plan and collect annual chemical inventory reports from facilities. Work with your LEPC to learn more about chemicals in your community! To find out which RMP facilities may affect the above location, you can:

**Note: Due to formatting differences in some web based Internet E-mail accounts (such as Hotmail) you may not be able to access the hyper linked websites below by clicking on them directly. If you first experience problems with the hyperlinks when you click on them, try cutting and pasting the full hyperlink (URL) into the "address" field of your web browser and press "enter", which should take you directly to the website.**

<https://mail.google.com/mail/u/0?ik=2d1d4153f9&view=pt&search=all&permthid=thread-f%3A1648280224623236864&simpl=msg-f%3A16482802246...> 1/2

## Caption: Appendix 3: EPA RMP Report Part 2

10/26/2019

Gmail - Re: Form submission from: Risk Management Plan Rule Vulnerable Zone Indicator System form

Contact your Local Emergency Planning Committee

(LEPC): <https://www.epa.gov/epcra/local-emergency-planning-committees>

View the Concerned Citizen page on EPA's Chemical Emergency Preparedness and Prevention Office website:

<https://www3.epa.gov/epahome/citizen.htm>

Read Chemicals In Your Community, a publication that tells you how to obtain helpful information that can help you build a snapshot of chemicals stored and released in your community: <https://www.epa.gov/epcra/chemicals-your-community>. A facility's vulnerable zone is based on one or more "off-site consequence analyses"(OCAs) submitted to EPA as part of their Risk Management Plan. To learn how you can access Off-Site Consequence Analyses (OCAs), visit: <https://www.epa.gov/rmp/federal-reading-rooms-risk-management-plans-rmp>

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This is a PRIVATE message. If you are not the intended recipient, please delete without copying and kindly advise us by e-mail of the mistake in delivery. NOTE: Regardless of content, this e-mail shall not operate to bind CGI Federal, Inc. to any order or other contract unless pursuant to explicit written agreement or government initiative expressly permitting the use of e-mail for such purpose.

On October 24, 2019 at 12:00 AM EPA via EPA < [no-reply@epa.gov](mailto:no-reply@epa.gov) > wrote:

Submitted on 10/24/2019 12:00AM

Submitted values are:

E-mail Address: [kdave98@gmail.com](mailto:kdave98@gmail.com)

Street Address: 3700 W 190th Street

City: Torrance

State: California

Zip Code: 90504

Country: United States of America

Nearest Intersection:

Nearest Intersection 2:

---

RMP Reporting Center, CGI Federal Inc., [12601 Fair Lakes Circle, Fairfax, VA 22033](https://www.epa.gov/rmp)

P.O. Box 10162 Fairfax, VA 22038

Phone: (703) 227-7650

Fax: (703)227-4199

E-mail: [RMPPRC@epacdx.net](mailto:RMPPRC@epacdx.net)

**Caption: Appendix 3: EPA RMP Report Part 3**

STAKEHOLDER SKETCH		
<p>In this sketch, list different kinds of social actors -- "stakeholders" in governance parlance -- and the forces that enable and disable them. Sometimes stakeholders will be distinguished by their class position, place of residence, ethnicity or expertise. In some cases, it is important to splice groups usually seen as one: recognizing the way gender and generation makes a difference, for example. <b>List the stakeholders down the middle. In the left column, list catalysts -- things (money, honorable reputation, etc) that enable that group of people to get what they want. In the right column, list corrosions -- things that undermine their ability to get what they want (lack of money or status, youth, gender, poor organizational skills. In filling it all in, you create a quick map of power dynamics.</b></p>		
catalysts	"stakeholders"	corrosions
Power in number, Provides jobs to community, economic growth	Neighborhood community	Other immediate issues to worry about such as health, education, money
Profit and growth of business	Torrance Refining Company	Regulations placed by the government
Profit	PBF Energy (parent company to Torrance Refinery)	Regulations and not always being present/on the site
Professional experience	Students (refinery holds summer jobs for students called the Torrance Youth Development Program)	Competition between other students
Income, stable job,	Workers	No other option, the only source of work so they do not want to get fired
Safety of workers	California Division of Occupational Safety and Health	Budget

**Caption: Appendix 4: Stakeholders Sketch**

## ABOUT THE AUTHORS

### BIOGRAPHICAL STATEMENTS

Kushal Dave is a fourth-year Biological Sciences major attending the University of California Irvine. He plans on attending medical school after graduating from his undergraduate schooling in order to become a medical doctor. Kushal wants to be in a field where he can interact with others and have a positive influence on their lives and found medicine can allow him to do both.

### PHOTOS



Edgar Santana is a fourth-year Civil Engineering major, specializing in Transportation Systems. His post-undergraduate ambitions include





working for transportation agencies at the city, state, or federal level. He is particularly interested in areas of transportation research that involve “Connected Vehicle Technology” and Autonomous Vehicle Infrastructure.

Brandon Shamoo is a second-year Computer Science major at the University of California, Irvine. He is interested in artificial intelligence and environmental protection.



Patrick Yang is a first-year Chemical Engineering major at the University of California, Irvine. Attempting to discover or enhance alternative fuel sources, he is interested in researching sustainability and resolving the global climate change phenomenon. As he finishes his studies in Chemical Engineering, he intends to pursue a double major in Business Administration in pursuit of expansion in his comprehension of a field that revolves around the immediate world today as well as a combination of self-interest in the topic. Furthermore, in determination to deepen his





understanding of the universe, Patrick plans to obtain his Doctorate degree in Chemical Engineering.

Alicia Martinez is a fifth-year undergraduate student at the University of California Irvine, she is currently pursuing a major in History with a minor in Biology and Film and Media Studies. After graduating she plans on working in a museum before applying to graduate school when she hopes to get a higher degree in Latin American History. Alicia has always had an interest in environmental injustice and hopes to one day incorporate that into her field of study.



Christine Voong is a second year Business Economic major at the University of California Irvine. She plans to minor in Computer Science by her third year of university. Interested in the response to economic in the household level to market level in both national and international settings.



Dominic Al-Shamari is a third year Biomedical Engineering undergraduate at the University of California, Irvine. He plans to specialize in Brain-Computer Interfacing with a focus on the engineering challenges in the effort to link single neurons to electronic components. Dominic aims to grow his own research community into a successful private commercial laboratory, with a focus on bioengineering and biophysics applications. He currently devotes his efforts and time to the learning and advancement of BCI technology, and spreading awareness of humanity's responsibility to our Pale Blue Dot.

