Photo by U.S. Navy Petty Officer 2nd Class Diana Quinlan

After Action Review of San Diego County's Air Monitoring Response to the July 2020 USS Bonhomme Richard Fire

CARB Monitoring and Laboratory Division
Incident Air Monitoring Section

CARB Air Quality Planning and Science Division
Community Air Quality Section

CARB Research Division
Health & Exposure Assessment Branch

CALIFORNIA
AIR RESOURCES BOARD

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Introduction

This after-action review (AAR) seeks to assess the effectiveness of San Diego County's air monitoring response to the July 2020 fire aboard the Navy's USS Bonhomme Richard. AARs are conducted to evaluate actions taken during an incident and provide observations and learning opportunities to better prepare for future events. In addition to evaluating the response, this review also includes an analysis of the air monitoring data gathered and reported during the event, and a review of potential associated health impacts.

During the July 21, 2020, AB 617 Portside Steering Committee meeting, many members of the community adversely impacted by the ship fire voiced their concerns with San Diego County Air Pollution Control District's (APCD or District) air monitoring response and the fire's impact to their health[1]. The Environmental Health Coalition (EHC), a local community-based organization, acted on those concerns by requesting the California Air Resources Board (CARB) conduct an evaluation of the response and issue a report containing recommendations to improve preparedness and strengthen air monitoring for future air quality episodes. CARB formed an interagency working group and selected agencies with a variety of expertise and broad perspectives to conduct the post incident review that assessed how agencies involved in the response communicated, coordinated, and reacted during the incident. The working group included members from CARB staff, San Diego County Office of Emergency Services (SD OES), and APCD. Others consulted were the U.S. Navy, U.S. Environmental Protection Agency (EPA), Cal EPA, California Office of Environmental Health Hazard Assessment (OEHHA), California Office Spill Prevention and Recovery (OSPR), California Office of Emergency Services (OES), local community groups, and the public.

This report summarizes the AAR, identifies preparedness and operational deficiencies, and describes opportunities for improvement. Recommendations in this report were used by APCD to develop and adopt its newly released incident response plan and can be used by other local response agencies in the San Diego area to improve their capabilities and programs. This report also includes an analysis of the air monitoring results and review of potential health impacts that the public can use to further understand the consequences of the fire's smoke. Lastly, for those concerns that may be beyond APCD's role to address, the report provides additional resources which may be of interest.

1 At the time of the incident, APCD was part of San Diego County, but became a separate entity with its own governing board on 3/1/21 pursuant to California Assembly Bill 423.

Background

On the morning of July 12, 2020, around 8:50 am, the U.S. Navy responded soon after ignition to a fire aboard the USS Bonhomme Richard while the ship was docked at the U.S. Navy's shipyard in San Diego for maintenance and upgrades. Large or complex emergency events require a coordinated response to organize the variety of responding agency's actions. Unfortunately, the U.S. Navy and SD OES did not establish a unified command structure which would have involved local governments in the incident command's organization. This omission deprived the incident command of many of the resources outlined in various local, regional, State, and federal emergency response plans that define procedures to manage actual and potential offsite impacts and consequences, leading to a response that raised concerns by the community. The ship continued to burn for five days, sending smoke into downwind neighborhoods, and on July 16, 2020, the U.S. Navy announced that all known fires aboard the ship had been extinguished.

Existing federal emergency response plans identify the Navy as the lead agency for this incident[2], describe its responsibilities for overall management of the incident, and highlights ways to improve overall emergency planning in the San Diego area. As the lead agency, the U.S. Navy was responsible for notifications, identification of environmental, health hazards, and safety risks, and to coordinate the response to address those risks[3]. These plans provide specific procedures of how local government are to be included in the response - the federal lead agency can request that local government join the incident command functional structure, or alternatively, the local government can ask to join and be included into incident command. Additionally, the federal response plans specify that the State On-Scene Coordinator, in this case the State of California, was responsible for representing the interest of the County of San Diego in their absence from the unified command structure. Furthermore, the plans characterize San Diego as a military town, and that response planning in the region should include operational preparedness to address potential incidents at any of the coastal military installations, including Marine Base Camp Pendleton, Navy Base Point Loma, Navy Base Coronado, Navy Base San Diego, and the entire San Clemente Island.[4]

The table in Appendix A provides an overview of the emergency response plans reviewed by CARB staff for this AAR, describes resources that would have been available to the U.S. Navy if SD OES was included in the response, and ways members of the public can be involved in local, regional, State, and federal emergency response

2 Regional Response Team IX Regional Contingency Plan, 2019; Section 2114; Page 83.
3 Regional Response Team IX Regional Contingency Plan, 2019; Section 2113; Pages 81 - 83.
4 San Diego Area Contingency Plan – 6, 2018; Section 9810, Page 9800 - 14.

planning and risk reduction. Appendix B lists material referenced by CARB staff during the AAR which includes two investigation reports developed by the Navy, one report is specific to this incident, and the other report is a comprehensive historical review of major fires onboard U.S. Navy ships.

Findings and Recommendations

The absence of local agencies in a unified command established for the ship fire led to an independent air monitoring response by APCD. Existing local, regional, State, and federal emergency response plans spell out a limited role for APCD in incidents such as the Navy vessel incident, while the APCD's incident response protocols at the time were primarily focused on monitoring for wildfire smoke and other more conventional unplanned situations. The omission of SD OES from the unified command led to a delayed initial start by APCD with degraded communication throughout the event; however, once the District was notified of the event, it organized a team of their staff to conduct air monitoring and communicate results to the public.

Complications with the initial notification process resulted in the APCD not being informed of the incident until 5:43 pm on July 12, 2020, the first day of the incident, which was well over eight hours from when the fire first started earlier that morning. Once aware of the situation, APCD began posting advisories on its website with outgoing recordings and mobilized staff to begin supplemental air monitoring and specialized sample collection. Air quality monitoring continued throughout the ensuing week, into the following weekend, and concluded on the following Monday (July 20th).

During the incident APCD reported information and results to the public as soon as it was available, modified its website and provided links with current data, and included smoke advisories in English and Spanish. Additionally, APCD used social media and other communication methods to direct the public to its website to receive current updates on the situation.

APCD supplemented their existing traditional air monitoring network by deploying additional monitoring resources:

- APCD field staff deployed portable samplers at the end of the first day of the event. Starting Tuesday, the hourly particulate data collected by these samplers was posted on the APCD website three times daily (9:00 am, 2:00 pm, and 5:00 pm).
- APCD made particulate and black carbon data results gathered from samplers at Sherman Elementary School immediately available on their website (these samplers are part of the routine monitoring network in the Portside community).
- The APCD monitoring team collected point samples of volatile organic compounds on multiple days and locations.

To prioritize analyzing the collected volatile organic compound samples, the District adapted its laboratory operations and shifted schedules during the incident. Data from the analysis of these samples was then sent to the California State Office of Environmental Health Hazard Assessment (OEHHA) staff for review and comparison to health-based indicators. Following this review, the data was posted to the APCD's website alongside historical data collected at two San Diego monitoring stations with available reference exposure levels for each compound measured. APCD's communication strategy was to convey information using standard language messaging so that the public could stay informed of the poor air quality conditions caused by the fire. In addition to the information provided on the APCD website, the District also conducted interviews with television, radio, and print media outlets to address public questions and concerns throughout the incident.

CARB originally became aware of the community's concerns regarding APCD's response to the event and associated health impacts from the smoke at the District's July 21, 2020, AB 617 Community Air Protection Program meeting. During the steering committee meeting, community members voiced their interest in the incident, and in a subsequent letter, EHC requested CARB conduct an evaluation of the APCD air quality monitoring conducted during the event. In response, CARB's Monitoring and Laboratory Division established a working group of local, State, and federal agencies to better understand and address the community's concerns. The working group held focused review sessions to establish the order of events which occurred during the incident and developed a list of key questions or concerns related to actions from responding agencies. Appendix C provides a timeline and chronology that include details of SD OES' response to the incident, its efforts to assist the Navy, as well as APCD's actions upon their notification.

Concurrently, CARB's Air Quality Planning and Science and Research Divisions conducted an analysis and health impacts review of air monitoring data collected during the incident. Next, CARB presented the recommendations, analysis of the data, and its review of the health impacts to the public at a September 30, 2021, workshop. The purpose of the workshop was to share preliminary data analyses, findings and recommendations with the community and ensure that the community's concerns had been properly heard and understood by the working group. CARB released this final report after a public review and comment period on a prior May 2022 draft version. Appendix D is a compilation of community engagement materials used by the AAR working group and includes summaries of the July 21, 2020, AB 617 Community Air Protection Program meeting, summary of the September 30, 2021, public workshop, the July 31, 2020, EHC letter, results of an EHC survey of the community, and a summary of the public's comments with CARB's response. After the conclusion of the public workshop, the working group used these documents to finalize its recommendations. APCD used many of these recommendations to develop its

updated incident response plan which the District's Governing Board officially adopted in January 2022. Other agencies in the San Diego area may also choose to consider recommendations identified in the report to revise and improve emergency preparedness and response within their programs.

The key recommendations were identified and organized into four main categories:

- Preparedness: Turning awareness of risks into actions which improve capability to respond to unexpected events.
- Coordination: Actions of managing a response through a standardized, defined system of organization.
- Response Operations: Execution of actions and operations required to manage and react to emergencies.
- Public Communication: Communication that includes notices, alerts and messages which relay information about incident and response status, self-protective actions, and other matters that impact the community.

Table 1 summarizes the community's questions and concerns with the corresponding recommendations:

Table 1: Summary of Key Questions and Concerns with Recommendations

	Key Questions & Concerns	Recommendations
Preparedness	Are APCD's incident air monitoring response plans adequate?	APCD should update, expand, and incorporate recently identified best practices from other agencies into its incident response plan to make it more comprehensive.
	Are APCD's capabilities adequate to support its defined roles in local and regional response plans?	APCD should continue to review its internal capabilities and the capabilities of other local, state, and federal agencies and document them in its incident response plan.
	Does APCD practice (drill) its response plans?	APCD should continue to conduct periodic incident training, drills, and exercises with partner agencies with an emphasis on hazards and scenarios specific to the port and other industrial areas.

Table 1: Summary of Key Questions and Concerns with Recommendations (continued)

	Key Questions & Concerns	Recommendations
Coordination	There was uncertainty about which agency was responsible for leading the response, along with failures to include local agencies in the command structure established for the incident.	APCD should expand partnerships with responding agencies and responsible parties to clearly define roles in incident response plans and operate within the incident command framework.
	APCD did not have a dedicated 24-hour response hotline to receive and confirm incident notifications.	APCD should continue to work with local, State, and federal response agencies to strengthen and improve internal notification procedures.

	Key Questions & Concerns	Recommendations
Response Operations	What types of pollutants can be measured and how quickly can APCD report on these airborne hazards?	APCD's incident response plan should clearly define its air monitoring and reporting capabilities and how they complement those of responding agencies. The air district capabilities should be published on its website and shared in other forms of public communication.
	Does APCD have the proper resources to monitor, analyze, and report results during air quality incidents?	APCD's incident response plan should identify potential hazards in the District and anticipate resource needs to react to these hazards.

Table 1: Summary of Key Questions and Concerns with Recommendations (continued)

	Key Questions & Concerns	Recommendations
Public Communication	Was information about the event actionable, timely, easy for the public to understand, and presented in multilingual formats?	APCD's incident response plan should improve communication procedures for incidents describing capabilities of the district, the expected reporting schedule, and actions the public can take to limit exposure. Results should be reported in user friendly, multilingual formats, such as infographics, imagery, and charts to present clear, useable information.
	APCD's public communication was not able to achieve coordinated messaging with responding agencies since it was not integrated within the unified command structure.	Through an established unified incident command structure that includes the District, coordinated messaging would be improved.
	Public communication of monitoring results needed more contextual health information.	Information related to health impacts can be improved with the addition of the County Public Health Department in the unified command structure along with APCD including more detailed health information in its communications when appropriate.

Since the incident and adoption of its incident response plan, APCD has taken or is in the process of taking the following steps to improve emergency preparedness in their area:

- Collaborated with the U.S. Navy on reviewing roles and responsibilities to improve interagency coordination while responding to incidents.
- Participated in a table-top exercise organized by the U.S. Navy to become more familiar with the Navy's incident response protocols and operations.
- Assisted the County's Office of Emergency Services (OES) to expand its network of contacts with Emergency Managers from the 18 municipalities in the San Diego region, with SD OES' military lead, Cal OES, and Cal Fire.
- Engaged the U.S. EPA to identify appropriate contacts in case of an incident and SD OES to ensure District staff are part of all the appropriate SD OES distribution lists for emergency notifications.
- Created a multilingual webpage dedicated to incident response resources where APCD's incident response plan can be found, as well as information on

how members of the public can protect themselves during an incident. https://www.sdapcd.org/content/sdapcd/air-quality/incident-response.html

- Ensured APCD executive management are available 24/7 to receive notifications from SD OES when an incident unfolds that requires APCD's support. Also, APCD is improving its process to receive and respond to air pollution complaints from the public, including processes associated with its 24-hour public complaint hotline.
- Dedicated a Public Information Officer/Outreach Coordinator position to assist with outreach and communication including during incidents.
- Redesigning and updating its website to improve its presentation of air quality data and make its functions more accessible to the public.
- Promoting SD OES regional website www.ReadySanDiego.org that has multilingual emergency preparedness information to residents. These resources are invaluable and contains information on how to sign up for AlertSanDiego, the region's mass notification system.
- Established the Portside Air Quality Improvement and Relief Incentive Program to purchase residential portable air purifiers along with indoor air monitoring and data analysis for residents of the Portside community. https://www.sdapcd.org/content/sdapcd/grants/grants-equipment/portside-air-quality-improvement-and-relief--pair--program.html

SD OES, U.S. EPA, and the U.S. Navy have also taken steps to improve emergency preparedness in the San Diego area since the incident. At the September 30, 2021 public workshop, these agencies provided updates on their work. The Chair of the San Diego APCD has also committed to working closely with SD OES and APCD staff to ensure that they have improved, efficient, and transparent notification plans.

SD OES provided notice of the work to revise their emergency response plans in 2022, the addition of APCD to the plan's Environmental Health Annex, their planned updates to the multi-jurisdictional hazard mitigation plan, welcomed the public to provide their input on these plan revisions, and committed to providing links on their website in the coming months.

The U.S. EPA described what aid is available upon review of the incident and their intentions to work towards providing improved support in the future. Lastly, the U.S. Navy has conducted various internal and external exercises to address emergency and environmental management since the incident and committed to continuing to build on the established relationships they currently have with their partners, while also building new relationships to ensure strong communication, fortified teamwork, and most importantly, the safety of its sailors, personnel, and surrounding community residents. To address issues brought to light by the Bonhomme Richard fire and other major fires that have occurred in the past twelve years at naval shipyards, the Naval Sea Systems Command has established a new industrial fire safety assurance group to

coordinate efforts within its organization to prevent future industrial shipboard fires. For non-military facilities in the San Diego area, community leaders and members can contact the San Diego County of Environmental Health, Hazardous Materials Division at the number provided in Appendix A for more information on the California Accidental Release Program for more information on their risk reduction program.

The role of the public in preparing for potential incidents was also emphasized during the September workshop. Graphics promoting tools the public can access and use to aid in their disaster readiness and emergency preparedness were presented. These materials can also be found in Appendix E. During the workshop, the SD OES Director encouraged the community to sign up for their emergency preparedness tools AlertSanDiego and ReadySanDiego (See the emergency preparedness presentation in Appendix E for links). Members of the community are also encouraged to contact APCD for more information on the Portside Air Quality Improvement and Relief Incentive Program.

Analysis of Incident Air Monitoring Data and Health Perspective

Ten air monitoring datasets, including those collected by the U.S. EPA, San Diego APCD, Portside community, and the Navy, along with air parcel trajectories were analyzed for the time period during and after the fire. The air monitoring data indicated that the fire impacted the air quality of the nearby San Diego communities. During the fire, elevated levels of $PM_{2.5}$, PM_{10}, black carbon, and NOx were observed in the nearby communities. However, the elevated $PM_{2.5}$, PM_{10}, and NOx concentrations were still below the National Ambient Air Quality Standards. The elevated black carbon concentrations, when converted to the equivalent diesel particulate matter concentrations, were also below the chronic Reference Exposure Level (REL) of diesel exhaust.

As a result of the APCD emergency monitoring, several volatile organic compounds (VOCs) were shown to be present at elevated levels on July 12, 2020; however, none exceeded the acute RELs for 30-second samples or the 8-hour RELs for 5-hour samples. Additionally, for the 24-hour average VOCs concentrations monitored at the Sherman Elementary School, no exceedances of the 8-hour RELs or the chronic RELs were observed. RELs were available for five PM_{10} metals, though none exceeded either the 8-hour or chronic RELs during and after the fire.

The Navy provided air monitoring data including, CO, H_2S, VOC, and visual smoke observations for the workers' air pollution exposure safety. Measured H_2S concentrations were between 0 and 1 ppm. The highest CO and VOC concentrations were 16 ppm and 4.2 ppm, respectively, on July 12, 2020. Between July 13 and 20,

2020, Navy observations showed that most of the smoke traveled to the northeast, east, and southeast.

Throughout the AAR process, the communities closest to the fire expressed concerns about the cumulative impacts to their health of a decade's long exposure to a disproportionately high burden of toxic air pollutants made worse by smoke from the fire that smelled like burning plastic. Making matters worse, advisories issued by local agencies to shelter in place forced residents, many of which do not have air conditioning in their homes, to choose between exposure to the smoke, evacuating, or to remain inside with all windows and doors closed during a heat wave which was occurring at the time. The community reported a range of health impacts during the fire (See Appendix D for more information). The serious health impacts from both long and short-term exposure to particulate pollution, including respiratory and cardiovascular impacts, are well known. Appendix G provides an in-depth review of potential health impacts from short and long-term exposures to particulate emissions using known information on wildfires and structural fires. Long term exposure to higher levels of air pollution by residents can increase vulnerability to health impacts, although it's difficult to quantify this effect. While there is a large body of health literature on PM 2.5 health effects, including short-term health impacts to wildfire smoke, there are no published studies from the impacts of smoke from a fire aboard a naval vessel. While CARB cannot evaluate all the possible health impacts from the ship fire due to limitations on health studies and monitoring data, we have reviewed all the data that we have available.

Health impacts from the navy ship fire depend in part on the level and types of toxic pollutants released during the fire. Part of the smoke from the USS Bonhomme Richard fire could be from burning plastics. The open burning of plastic material releases toxic gases and particulate matter that include polycyclic aromatic hydrocarbons. Also, particulate soot and residue solid ash from open combustion of plastics include high concentrations of sodium, calcium, magnesium, silicon, and aluminum. However, the pertinent monitoring data were not available to support any analytical conclusions for most of these chemicals emitted during the USS Bonhomme Richard fire.

In terms of PM 2.5 pollution, although elevated levels were seen, all levels were below the 24 hour National Ambient Air Quality Standards for PM 2.5. Although the data analysis found that there were no exceedances of known health values for the toxic pollutants measured, there were large gaps in the monitoring data. It is also important to note that an individual's exposure can be different from that recorded by the monitors due to wind patterns and monitoring locations. Given the limited monitoring data for this fire, and the lack of health standards for many of the toxics that were measured, we cannot make conclusive findings on health impacts. There is also a lack of information on the health effects of smoke from a burning naval vessel. While we don't see data indicating a health threshold was exceeded, we also know that more

complete monitoring data could provide a clearer understanding of possible health impacts. In summary, residents clearly experienced short-term health effects. While we can't rule out long-term impacts due to the data gaps mentioned above, the available information does not clearly demonstrate these impacts.

Conclusion

Existing emergency response plans describe the role of local, regional, State, and federal response agencies to respond to all types of emergencies, and air monitoring to inform public protection advisories is a shared role amongst those agencies. Although existing plans and APCD's newly revised and released incident response plan identify the District in a supporting role, the APCD should use recommendations presented in the report that have been vetted by the community to continue their work improving emergency preparedness for port and industrial incidents in their area commensurate with their authority.

APCD used this report's recommendations to strengthen its incident response plan, and other local agencies may also choose to use these recommendations to improve emergency response preparedness in the San Diego area. Also included is an analysis of the data collected during the incident along with information on data gaps and a review of potential health impacts. Recognizing that the impacted community may have concerns that are beyond the district's role to address, the report identifies additional resources that community members and their local leaders can pursue.

The San Diego County risk management and emergency response agencies identified in Appendix A should continue to improve risk management, interagency coordination, and communication procedures. These local agencies can implement the recommendations described in this report for improved coordination between SD OES, APCD, and other response agencies and provide periodic public updates on their progress - improving communication amongst these agencies has the greatest potential to address the issues with incident notification. Lastly, existing emergency response plans also have provisions for sheltering operations that were not used during the fire that can address or supplement a hotel voucher program.

Appendix A. Review of Emergency Response Plans

Table A-1: Overview of Emergency Response Plans Reviewed for After Action Report

Plan	Type and Purpose	Air Monitoring and Coordination Assets	Public Involvement
Regional Response Team (RRT) IX Regional Contingency Plan and San Diego Area Contingency Plan-6 (ACP 6)	Federal oil or hazardous substance spill emergency response plans to ensure proper local, regional, State, and federal coordination for a major event.	U.S EPA Region IX response team with mobile response van and monitoring capable aircraft.	The RRT Coordinator can be contacted at Jones.bill@epa.gov. The San Diego Area Committee is responsible for the ACP and participation is open to all concerned parties. The Caption of the Port for the San Diego Area Contingency Plan can be contacted at (800) 854-9834 or (619) 278-7000.
California State Emergency Response Plan	State all hazard emergency response plan to ensure proper local, State, and regional coordination for events that overwhelm regional mutual aid capabilities. California Office of Emergency Services (Cal OES) coordinates mutual aid at the state level	California Guard Civil Support Teams that are requested by local emergency services.	State agencies participate in the review and revision process with Cal OES as the lead agency. More information can be obtained from Cal EPA at Jason.Boetzer@calepa.ca.gov.
Local Emergency Planning Committee (LEOC) Region VI Hazardous Materials Emergency Plan	Federally required regional emergency response plan to ensure proper local / regional coordination and mutual aid when member counties are overwhelmed by an incident. Incorporates individual federally required county area plans.	Air monitoring assets are local resources within the responding county and available from other counties via mutual aid.	LEPC membership must include (at a minimum): Elected state and local officials; police, fire, civil defense, and public health professionals; Environment, transportation, and hospital officials; Facility representatives; and Representatives from community groups and the media. Contact jose.contreras@caloes.ca.gov.

Table A-1: Overview of Emergency Response Plans Reviewed for After Action Report (continued)

Plan	Type and Purpose	Air Monitoring and Coordination Assets	Public Involvement
San Diego County Operational Area Hazardous Materials Area Plan	Federally required county level emergency response plan that forms basis of mutual aid and Community Right to Know. Describes San Diego County's emergency response capabilities and incorporates local non-military business hazardous materials business plans.	San Diego county air monitoring, coordination assets, and procedures are described in detail in separate county emergency response plan.	The San Diego County Department of Environmental Health, Hazardous Materials Division (HMD) is the administering agency and assisted by the San Diego County Office of Emergency Services (San Diego OES). Coordination, incident critique, and follow up are through the San Diego County Unified Disaster Council (UDC), which is chaired by the County Board of Supervisors and comprised of representatives from the county, each of the 18 incorporated cities, and MCAS Miramar. **HMD also administers the County's risk reduction program and can be contacted at (858) 694-3900.**
San Diego Operational Area Emergency Plan	Local emergency response plan that provides response procedures for local agencies.	The joint county and San Diego Fire Department Hazardous Incident Response Team (HIRT) has >75 certified Hazardous Materials Technicians and Specialists and are typed as two Cal OES Type 1 Hazmat Teams. In addition, the HIRT has three hazmat units that are equivalent to Cal OES Type III standard. The teams HAZMAT Units include a mobile mini-laboratory for analyzing materials on scene. San Diego OES is responsible for the coordination and dissemination of emergency information through various operational mechanisms. The sheriff or local police department, assisted by other agencies and San Diego OES, are responsible for evacuations, while coordination of the Red Cross at an incident requiring care and shelter of evacuees rests primarily with the incident commander and the coordinating emergency operation center that may have been established.	San Diego OES prepares and maintains the county comprehensive emergency plans. In addition, it serves in an administrative capacity to the Unified Disaster Council HIRT. San Diego OES can be contacted at oes@sdcounty.ca.gov or (858) 565-3490.

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Appendix C. Chronology of Events

This response summary and chronology of events focuses on the notification and response actions of the San Diego County Air Pollution Control District (APCD or District), the County's Department of Environmental Health and Quality (DEHQ), and the County's Office of Emergency Services (OES) to the fire aboard the USS Bonhomme Richard.

Sunday July 12th, 2020

- At about 8:50 a.m. an explosion and ensuing fire occurred aboard the USS Bonhomme Richard in Pier 2 of the Navy shipyard in the City of San Diego.
- At 11:26 a.m. the County of San Diego's DEHQ Hazardous Incident Response Team (HIRT) learned of the fire on the news and contacted the City of San Diego Fire Department to determine if hazmat resources had been requested. No request was made from San Diego Fire Department dispatch for HIRT to respond to the incident.
- 11:45 a.m. CalOES Southern Region Duty Officer emailed County OES inquiring about the incident, County OES looked to local media in reference to the event, and subsequently notified the OES Director upon confirmation of the incident.
- 12:06 p.m. County OES made initial contact with the HIRT Duty Officer who was aware of the situation and had already contacted the Navy and Coast Guard. There were no requests for assistance from these federal agencies.
- 12:12 p.m. County OES made initial contact with the City of San Diego's Office of Homeland Security (OHS) Duty Officer to determine if there were any unmet needs. OHS advised that City Fire resources were assisting with the fire, and that there were no unmet needs or requests for assistance with Alert & Warning of the public.
- 12:24 p.m. County OES updated CalOES regarding communication with HIRT and OHS.
- 12:28 p.m. County OES called Navy Region Southwest to determine if there were any unmet needs. Navy advised they would have their Emergency Manager contact County OES.
- 12:42 p.m. County OES called the National City's Emergency Manager (EM) regarding any unmet needs. National City requested template language for air quality as they were considering a social media post.
- 12:46 p.m. The San Diego Medical Health Operational Area Coordinator (MHOAC) notified County OES that a mass casualty incident (MCI) had been declared as outlined in Annex D of the Operational Area Emergency Operations Plan. It was confirmed at 1330 hours that the MCI was declared at 11:02 a.m.
- 12:46 p.m. County OES made request for HIRT to provide air quality template language for National City to advise residents on safety precautions that should be taken to limit any potential health impacts from smoke.
- 12:50 p.m. the California Governor's Office of Emergency Services (OES) State Warning Center emailed Hazardous Materials Spill Report: CalOES Control #:20-3678, stating that

the National Response Center and the United States Coast Guard (USCG) had reported a fire aboard the US Naval Vessel USS Bonhomme Richard at Naval Base San Diego.

- 12:58 p.m. DEH received email update from County OES that they were monitoring the fire and no requests for assistance from the Navy had been received.
- 12:59 p.m. County OES Director emailed a written briefing on ongoing event to County leadership.
- 1:10 p.m. HIRT provided County OES information on Shelter-In-Place language to share with the City of National City.
- 1:12 p.m. County OES emailed the Shelter-In-Place language to the National City EM.
- 1:13 p.m. County OES called National City EM to confirm receipt of the Shelter-In-Place language. National City requested information on Chula Vista's stance on Alert & Warning.
- 1:15 p.m. County OES called Chula Vista EM to determine unmet needs or requests for Alert & Warning.
- 1:26 p.m. County OES called National City EM and advised that Chula Vista was not planning on issuing Alert & Warning. National City EM stated they were considering Alert & Warning.
- 1:28 p.m. County OES advised OES Director of the potential use of Alert & Warning.
- 1:30 p.m. HIRT spoke to Navy Environmental Manager. No assistance or resources were requested. He was on vacation at the time and not on scene.
- 2:20 p.m. Navy EM called County OES and advised that the Navy was gathering information regarding what was burning, and for how long it was anticipated to burn.
- 2:24 p.m. County OES emailed National City EM with requirements for an AlertSanDiego campaign.
- 2:41 p.m. National City EM emailed County OES with formal request to assist with sending an AlertSanDiego campaign.
- 2:58 p.m. National City Fire Chief completed the voice recordings in both English and Spanish.
- 2:58 p.m. County OES sent the AlertSanDiego campaign to all registered National City residents.
- 4:14 p.m. to 4:54 p.m. County OES placed 5 calls and received 3 calls from/to National City, HIRT, and the Navy to continue to share information. The Navy EM stated it was still unknown what is burning, which ship compartments are affected, and for how long resources will be committed.
- 5:06 p.m. Naval Base San Diego notified County OES that a Shelter-In-Place was issued for Wet-side (Sector A) on Naval Base; north of Pier 5.
- 5:18 p.m. to 6:43 p.m. County OES placed 5 calls and received 1 call from/to National City, County OES Director, CalOES, and the Navy to continue to share information.
- 5:28 p.m. DEH management mobilized HIRT to the scene to obtain Navy environmental contacts to provide to APCD for coordination of air quality management. HIRT responded to the scene and conducted air monitoring with a hand-held device. No detectible levels were observed for volatile organics (VOCs), carbon monoxide, flammability, phosphine, chlorine, and hydrogen cyanide near the incident location or off-site adjacent to the base. On-scene Navy environmental contact information was obtained.

- 5:31 p.m. County OES Director emailed a written briefing on ongoing event to County leadership.
- At 5:43 p.m. APCD staff were notified of the event and plans to initiate air monitoring begun immediately. APCD staff also updated the District's air quality forecast and report on the website to include a smoke advisory related to the fire by 6:30 p.m.
- By midnight, the District had deployed two portable particulate matter monitors and began collecting data (one at the Chula Vista site (approx. 6 mi. SSE of fire) and one at a Fire Station near Interstate 15 and Oceanview Boulevard (approx. 2 mi. to the East). These sites were chosen due to existing site use agreements, the availability of electrical power, and no obstructions to wind flow.
- APCD collected four instantaneous air canister samples ('grab samples') to be analyzed for toxic volatile organic compounds (such as benzene and chlorinated hydrocarbons) in the District laboratory. Samples were collected in National City (8:35 and 8:55 p.m.), Sherman Elementary School in Sherman Heights (9:30 p.m.), and a parking lot at San Diego State University (11:02 p.m.).

Monday July 13th, 2020

- 9:50 a.m. HIRT provided to the Navy air screening results that HIRT had received from their equipment the previous day.
- Throughout the day, APCD continued to measure hourly particulate matter levels in areas around the fire using the portable monitors deployed the previous evening.
- All available VOC canisters were deployed by the District.
- APCD began posting particulate matter concentrations measured by the portable monitors installed for this incident, as well as the toxic-VOC data collected on Sunday, July 12th on the District's website and on Twitter.
- The District developed plans to update and post to its website particulate matter concentration data three times daily (9:00 a.m., 2:00 p.m., and 6:00 p.m.) through Monday, July 20th. VOC data was posted as soon as it became available and after it had been reviewed by California's Office of Environmental Health Hazard Assessment (OEHHA) throughout the remainder of this incident.
- APCD issued a Notice of Violation to the U.S. Navy. This enforcement case is currently ongoing.

Tuesday July 14th, 2020

- Additional canisters were not available for collection on Monday as they were being processed from use on Sunday evening or were already deployed for the scheduled VOC sampling run on July 14th at Sherman Elementary School and the Donovan site near Otay Mesa.
- At 1:00 p.m. the California Environmental Protection Agency (CalEPA) California Air Resources Board and District held a call to discuss the event, current and planned monitoring actions and discuss if additional support was needed. Due that to fact that at this time the fire intensity was minimized, smoke from the fire was not impacting local communities with high levels of particulate matter, and District resources were in place and operational, additional support was not deemed necessary.

- At 2:26 p.m. ACPD received a call from the United States Environmental Protection Agency (USEPA) who explained that additional federal resources may also be available. The District had not been brought into the conversation earlier during a Regional Response call and was not aware that these resources may be available.
- The District contacted the National City's mayor's office to identify locations to deploy a third portable particulate air monitor.
- APCD collected additional canister samples for analysis of gaseous compounds which included the 30-second grab samples and one 5-hour sample to provide a longer sample collection period. The District collected these samples in a parking lot adjacent to NASSCO, Perkins Elementary School in Barrio Logan, and Chicano Park (also in Barrio Logan). The sample collection locations were identified after reviewing weather conditions and the maximum impact from the plume (all gaseous grab sampling locations were sited using this method from here on).

Wednesday July 15th, 2020

- San Diego County OES coordinated with National City, the Port of San Diego, 2-1-1 San Diego, and San Diego County Communications Office to distribute a press release on hotel vouchers for impacted residents.
- APCD continued the collection of canister samples for analysis of gaseous compounds. Sampling locations included Pier 2 on the Naval Base, a parking lot adjacent to NASSCO, Balboa Elementary School, Cesar Chavez Elementary School, and the Spring Valley Fire Station.
- APCD engaged with OEHHA, who reviewed the canister data and concluded that although some of the compounds measured were elevated relative to historical data, the values were still lower than levels that would indicate potential health hazards. APCD posted this information on its website and Twitter.

Thursday July 16th, 2020

- Once approvals were received, APCD deployed a monitor in National City after receiving approvals. Results from that sampler were added to the daily updates for the remainder of the incident.
- APCD continued the collection of canister samples for analysis of gaseous compounds. Sample locations included East 6th Street in National City and near Cesar Chavez Elementary School.

Friday July 17th, 2020 to Sunday, July 19th, 2020

- APCD collected two to three 30-sec grab samples and one 5-hour canister sample for the analysis of gaseous compounds each day through Sunday, July 19th, 2020.
- APCD concluded its special monitoring activities for this incident on Sunday July 19, 2020.
- Once the final canister sample was analyzed, APCD engaged with OEHHA, who reviewed the canister data and concluded that although some of the compounds measured were elevated relative to historical data, the values were still lower than levels that would indicate potential health hazards. APCD posted this information on its website and Twitter.

Appendix D. Community Engagement

Summary of July 21, 2020 AB 617 Community Air Protection Steering Committee Meeting

MEETING	San Diego Portside EJ Neighborhoods – CSC Meeting Virtual Meeting Using Zoom July 21, 2020 6:00 PM – 8:00 PM
MEETING DESCRIPTION	19th Monthly CSC meeting for the AB 617 Community Air Protection Program.
ATTENDEES	**Note: Public attendees cannot see participants in Zoom Meetings.** **SDAPCD Staff** – Jim Swaney, Bill Brick, Rob Reider, Nick Cormier and possibly others **CARB Staff** –Liliana Nunez, Steven Theantanoo, Jenny Melgo, Victoria Villa, Adrian Cayabyab, Alejandra Cervantes, Abhishek Dhiman, and possibly others **CSC Members** – About 20 members out of 26 **Facilitator** – Daniela Simunovic (Better World Group), and Chuy Flores (Estolano Advisors)

AGENDA

1. Welcoming Remarks (Daniela Simunovic, Facilitators and Bill Brick, SDAPCD)
2. Approval of 6/23/20 Meeting Notes and Agenda (Chuy Flores, Facilitator)
3. Navy Fire (Bill Brick, SDAPCD)
4. Public Comments
5. Sub-committee Updates (Chuy Flores and Sub-committee Rep)
6. CERP Update (Jim Swaney, SDAPCD)
7. Presentation: Emissions Inventory Portside Communities (CARB Staff)
8. Discussion: Office of Environmental Justice (SDAPCD Staff)
9. Update: SDAPCD Ozone State Implementation Plan (Nick Cormier, SDAPCD)
10. Closing Remarks
11. Adjourn

MEETING SUMMARY

1. <u>Welcoming Remarks by Daniela Simonovic, Facilitator and Bill Brick, SDAPCD:</u>

- Meeting started at 6:00 PM, and Daniela noted the packed agenda.
- Bill announced the resignation of 2 CSC members, Shaila Serpas, and Norene Riveroll. Stephanie Yoon will take Shaila's place since she was the alternate, but there is no alternate for Norene.
- National City's mayor Alejandra Soltelo-Solis was in attendance.

2. <u>Approval of 6/23/20 Meeting Notes:</u>

- Meeting Notes from 6/23/20 were approved.

3. <u>Navy Fire by Bill Brick, SDAPCD:</u>

- Both Bill and Rob Reider (Acting APCO) addressed the complaints with communication about the fire. SDAPCD promises to do better by working with various agencies, including the Navy, to review lessons learned, work on protocols, and planning going forward.
- Bill said within 5 hours of notification of the fire they installed monitors for PM2.5 and sent staff to take grab samples. They followed social media and took note of plume direction to decide where to take grab samples. They also have some filters and will try to get metals data.

- David Flores (CSC EHC) said EHC has been brutally honest in its displeasure with how the situation was handled but there are a lot of questions that need answers still. He asked, what is the emergency response plan, what did the monitoring data show, why were there no fenceline samples? He noted the lack of public notification and there is no lead for communicating. He hopes to share a dialog with the Navy too. He thanked the mayor for getting the word out about the fire.
- Margarita Moreno (CSC Resident) said there needs to be an improvement in how these situations are handled as information was not available in a timely manner. Residents were worried and there was no info so all they could do was smell the fumes, which smelled like burning tires. EHC said to not leave homes. There was no info from the Navy. If any changes are going to be made then it needs to be better communication with residents on what actions are going to be taken.
- Sandy Naranjo (CSC Mothers Out Front) thanked Mayor Sotelo-Solis, Supervisor Nathan Fletcher, and others for doing what they can. She reminded the air district about the link between COVID and air pollution. Steps need to be taken for transparency and accountability. She wants a report of what happened on the Navy ship. She wants to see a plan for how information will be shared with the community, and she wants resources to be made available in the future for those who may not be able to evacuate.
- Janice Luna Reynoso (Public, Mundo Gardens) said this was a case of environmental racism. She got her kids tested for COVID because they having trouble breathing. She wants the air district to provide data on what they were exposed to and what the air district is going to do about it. She wants more advocacy for greenspaces and for the air district to take a proactive approach.
- Jacqueline (Public, related to residents) made a non-negotiable request for the Navy and SDAPCD to release the cause of the fire and information about the toxics released. She referenced the same study Sandy mentioned about the link between COVID mortality and air pollution. She wants the Navy and SDAPCD to take responsibility.
- Christian Ramirez (Public, union rep and resident) called the Navy response a criminal action. He thanked the mayor for informing the community. He criticized the Navy for saying only papers were being burned in their first statement. He demanded SDAPCD and the Navy to share data, take steps to prepare for consequences, and get information for what will be needed in the future for these types of events. He said If a ship burned at Coronado Island the response would not be as slow.
- Alejandra Sotelo-Solis (National City Mayor) waited for other agencies to put out info, but couldn't wait any longer to share information. She asked the APCD to share info and explain what does toxic mean when releasing information. She mentioned SDAPCD setup monitors at her office. She wants to start a discussion on how emergencies on the Navy base can be addressed by the county's emergency system.
- Klause Golkee? (Public, resident) smelled the fire around 8 or 9 AM on Sunday and evacuated his home. He is fortunate to have resources to rent a hotel, but with COVID he knows he is taking another risk. The Port was late in offering hotel vouchers days after the fire started. He wants the Navy to treat the community like they treat people on board the ship. He criticized the Navy's statement about the fumes not being toxic since even burning wood creates air toxics. On a regular basis during normal Navy operations he smells paint fumes.
- Lori Saldana (Public, used to work in government) wants a report on the fire to be made public. She wants a public hearing to be held and wants the Navy to testify. She lives 15 miles away to the north but could still smell the fire. She asked if there will be medical evaluations and asked the county human and health services to track the health of people who have been exposed to the fumes since impacts may not be seen until later years.

- Samia Luna Marquez (Public, resident) wants an emergency preparedness plan developed and implemented in the future. She wants a report to be released about the fire. She smelled burning plastic for days and had symptoms similar to COVID. She got tested for COVID but came back negative. She holds SDAPCD and the Navy accountable and wants to ensure information is made accessible to everybody, not just those with technology. She suggested air purifiers for each household.
- Silvia Calzada (CSC resident) remarked that the comments made so far show the stress in the community. She has family in the Navy. She didn't know about the fire until 11 AM and found out through her local social media group. She is disappointed to hear this incident is a learning lesson and she heard that the Navy doesn't have an existing emergency response plan.
- Philomena Marino (CSC resident) said this is an opportunity to do better. An emergency contingency plan needs to be updated for chemical fires. The speaker system used by the Navy could help inform those nearby. The Navy could also use chemical detection on base. She voiced other concerns about long standing vehicle pollution issues too that could be incorporated into the emergency plan.
- Alicia Sanchez (CSC resident) said her husband has cancer and has respiratory issues. He uses a machine to help him breathe and on the filter of the mask there is a lot of residue from the fire. She believes the consequences from breathing in the PM will be seen in the future. She asks that consideration be given to the community concern.
- AC Dumaual (CSC Navy) apologized to the community and promised to work with the community better going forward. He knows communication is an issue and will make sure it is better. The Navy is still investigating the cause of the fire and will be transparent during the investigation. The cause of the fire is still unknown.
- Janette Reyes (Public resident) is disappointed at the Navy for lack of preparedness and communication. The community has been hit hard with COVID and pollution and she demands the Navy beaccountable.
- Klause Golkee? Added that he wants marine life and waterways to be addressed too, not just air quality.
- Rob Reider said it was sobering to hear all the concerns. SDAPCD will work on response time and smoke advisories. They will have contact information on the website. A notice of violation was issued to the Navy for smoke impacts, but it will be a long process to settle the notice. There may be a settlement which can be distributed to the community in the end. He asked the community to please continue to hold SDAPCD accountable.
- Julie Corrales (Public) echoed all the community comments. She wants to know all toxics that were released, and she wants a database to tracking data and exposure.

Environmental Health Coalition

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July 31, 2020

VIA ELECTRONIC MAIL

Richard Corey, Executive Officer
California Air Resources Board
1001 I Street
Sacramento, CA 95814
Richard.corey@arb.ca.gov

Re: Request for CARB Assistance on Evaluation of APCD Monitoring and Results Analysis of July 12, 2020 Navy Ship Fire.

Dear Mr. Corey,

Environmental Health Coalition (EHC) is writing to request that CARB evaluate the San Diego APCD air monitoring protocols, actual air monitoring and subsequent results for the recent fire incident aboard the Bon Homme Richard Navy Vessel from Sunday, July 12, 2020 to Thursday, July 16, 2020.

Background

On Sunday morning July 12, 2020, a 3-alarm fire broke out aboard the Navy ship USS Bon Homme Richard docked at Naval Station San Diego, located between Barrio Logan and National City. National City residents reported being overwhelmed by the odors in the early afternoon and throughout the day. Many said that they had to leave their homes because of the fumes and because they did not have air conditioning that would have enabled them to stay inside with the windows closed because of the heat. Residents that remained in their homes complained of headaches, nausea, and high levels of anxiety due to not having any information on how to protect themselves, family members, or neighbors. Residents have expressed fears for members of their families that suffer from respiratory diseases, asthmatic children, and long-term health impacts. EHC is deeply concerned and outraged that the San Diego County Air Pollution Control District (APCD) and Health Department were under-prepared to protect public health during a crisis like this. EHC attempted to reach APCD staff by mid-day Sunday after receiving calls for help from residents in National City, but we were unable to reach them. EHC worked with the National City Mayor to develop an advisory for residents to shelter in place and do what was possible to reduce exposure. This first notice came at 2:30 PM through a social media statement in English and Spanish warning the public and advising them to stay indoors. This was the only statement from an official source for hours. An APCD statement was finally shared by email after 6 pm advising residents to leave the area if possible due to smoke and lack of data on what chemicals and toxics were in it, or to reduce their exposure and physical activity.

APCD Emergency Monitoring

It is our understanding that APCD tested four (4) locations on Sunday night, July 12, utilizing collected air canister samples that represent chemical compounds in the smoke. These canister samples were tested at the APCD lab. There was also air pollution data from three particulate monitors placed in proximity to the fire. These analyses are found at these links:

- https://www.sdapcd.org/content/dam/sdc/apcd/PDF/Misc/APCD-Elevated-Compounds-Data-071220.pdf
- https://www.sdapcd.org/content/dam/sdc/apcd/PDF/Misc/APCD-Lab-Results-for-Canister-Samples-071220.pdf

From APCD analysis, the only location that provided a result above health standards was the San Diego State University (SDSU) sample with benzene above health standards. Analysis of the other three samples resulted in "no toxins that exceeded public health thresholds" according to APCD analysis and corroboration of these levels from OEHHA. Air pollution data collected on an hourly basis from the regular air monitoring also found at the APCD Monitoring Pollution Data Archive link: https://www.sandiegocounty.gov/content/sdc/apcd/en/CurrentAirQuality.html. The July 13 data confirms that levels were high at the Downtown San Diego monitor at 7:00 in the morning. The PM2.5 hourly average between 7:00 and 8:00 being close to 70 ug/m3. Black carbon was high at that time also (2.94 to 1.91 ug/m3) and wind was coming almost directly from the south. This matches the reports obtained by EHC from community air monitors located in the Logan and North Park communities. EHC Purple Air data from a community monitor in Logan presented highest PM2.5 levels at 7:00 in the morning. Additionally, this report was submitted to EHC from sample readings from a community Airbeam 2 sensor located in North Park where PM2.5 ug/m3 readings between 10:00 am and 11:00 present a peak then drop of 36 to 21, and PM10= levels from 68 to 32.

- Report: "The good news is that it's been dropping but the burnt plastic smell is really bad. The wind has been shifting from SW to W, which is helping us, but that will send it more directly to NC. Color wise, levels moved from orange to yellow."

As we continue our analysis of the data and process undertaken, EHC is working to provide community members with the information and resources to understand the impacts of the ship fire and demands made by residents, the AB 617 Portside Steering Committee, and local leaders. At the AB 617 Portside Steering Committee Meeting on Tuesday, July 21, 2020, the CSC heard from at least a dozen residents from both Barrio Logan and National City complaining of strong levels of smoke, toxic smells and stench throughout the region. Many concerns were raised: beyond many reports of headaches and nausea; families with asthmatic children worried about triggers and the heightened impact long term; individuals with respiratory issues about lingering effects and at home conditions for respirators and other breathing devices; and the overall lack of response and information by the Navy and APCD. EHC notes the following concerns:

1. Lack of noticing and communications to impacted community residents, which highlights that there is no system in place for this type of disaster.
2. No canister samples taken on Monday, July 13. This was reported by community members as one of the worst days for smoke with notable smell of smoke and burning plastics for 24 hours.
3. No fence line samples or monitors were deployed at all.

4. Usefulness and limitations of the publicly presented data. The technicality of the data as presented is of no use to community residents in order for them to understand the exposure risk to consider what actions those residents need to take in response.
5. The Navy has stated that the emissions from the fire were all "within EPA standards," however, has provided no basis for those statements, or if they have other monitoring data.

We look forward to a response to this request to CARB for assistance on the evaluation of APCD air monitoring and results analysis of the Bon Homme Richard Navy Vessel fire. Specifically, EHC requests assistance from CARB to:

- Review APCD protocols to confirm usefulness and limitations of the data collection sampling and monitoring.
- Review APCD protocols for noticing and communications for this type of disaster.
- Perform evaluation of APCD monitoring data for the period that monitors were mobilized and canister samples obtained from July 13 through July 16.
- Perform a full analysis of the APCD monitoring data to identify what gaseous pollutants were present from the monitoring and samples taken.
- Request the results from the Navy's analysis of this incident, as APCD has referred EHC to the Navy for this request. APCD has either not been able to gain specific information on what air quality tests the Navy conducted during the immediate hours of the response or is not disclosing it.

Thank you for your consideration of this request. I can be reached via email davidf@environmentalhealth.org, or at (619) 578-5557.

Sincerely,

David Flores
Air Quality Director

Results of Environmental Health Coalition Community Survey for Navy Ship fire

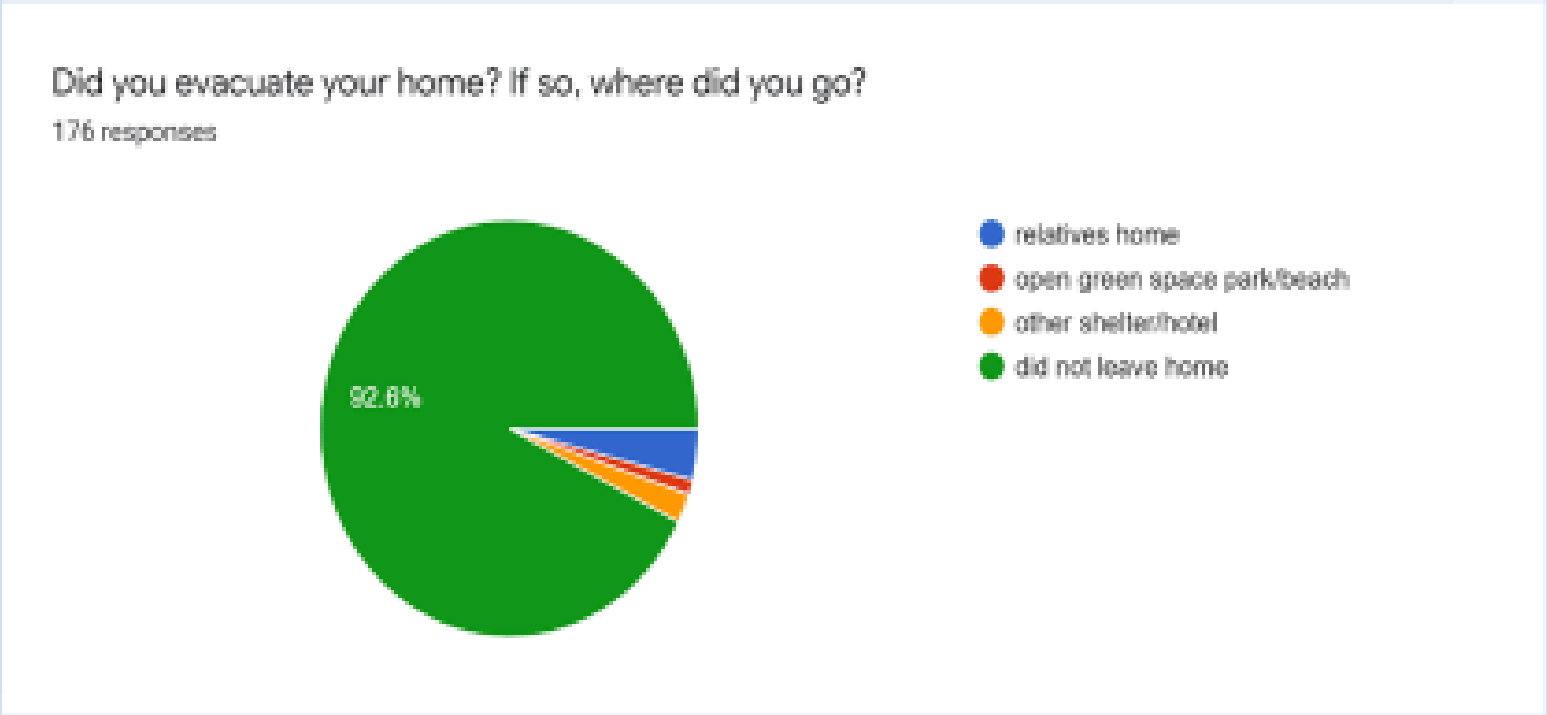
Quotes from local residents:

- "We live less than 2 miles from the Naval Base. My husband is asthmatic. My youngest is autistic and asthmatic. We had to close ourselves into the house. Turn on our AC. We had to close up our house for a week at least. As I mentioned, my son is autistic. My son was unable to understand why he had to remain inside. It was a difficult time".
- The ship was on fire in the middle of summer. It was hard to keep the doors and windows closed because it was so hot, and we do not have air conditioning in the home. Also, even when the doors and windows were closed. we could smell it".
- "I had complications with my breathing, trouble sleeping, and headaches".

Community Members Contacts:

- Total Calls: 1,500
- Total Surveys Completed: 249
- Residents Willing to Share Their Story: 94

92.8% Of Residents Did Not Leave Home



ENVIRONMENTAL HEALTH COALITION

Top 5 Health Outcomes Related to Navy Ship Fire:

- Headaches
- Throat Irritation
- Eye Irritation
- Coughing
- Sinus Irritation

USS Bonhomme Richard Fire Post Incident Review Public Workshop
September 30, 2021 Meeting Summary

Meeting Objective: Obtain input from the community impacted by the July 2020 fire aboard the U.S. Naval Vessel Bonhomme Richard on the preliminary results of an after-action review of this incident. The meeting will summarize the work that CARB and San Diego Air Pollution Control District (District or APCD) have done on the review and seek community input on the following:

- The preliminary findings and recommendations based on initial feedback from the community and facilitated meetings with air district / other responding agencies.
- A review of the health impacts.
- An analysis of all available air monitoring data with a comparison against known health values.

Welcome & Meeting Format

Meagan Wylie, Facilitator, College of Continuing Education, CSU Sacramento

Prior to the meeting start, the facilitator displayed a slide show on emergency preparedness resources in the San Diego area for attendees to watch as they waited for the meeting to start: https://ww2.arb.ca.gov/sites/default/files/2021-09/02_USSBH_Fire_PIR_Pre-Workshop_Announcement.pdf .

The facilitator provided instructions on the use of the Zoom meeting platform/translation services, agenda, and an overview of the meeting objectives.

Opening Remarks

Mike Miguel, Assistant Division Chief, Monitoring and Laboratory Division, CARB

Mike Miguel introduced San Diego County Board of Supervisor Vice-Chair / San Diego County Air Pollution Control District Chair Nora Vargas and CARB Board Member / Environmental Health Coalition (EHC) Director Diane Takvorian.

Summary of Supervisor Vargas comments:

Supervisor Vargas expressed her concerns about the well-being of some of the communities impacted by the fire and the continuing negligence on mitigating the ongoing environmental impacts they are experiencing. She shared her personal experiences during the fire and provided more detail on her concerns:

- The communities of Barrio Logan, National City were not properly notified of the health hazards of the incident.

- These communities have been disproportionality impacted by toxic emissions produced in that area for decades with inadequate communication of the risk posed by those emissions.
- Some of their community members report being overwhelmed by the toxic fumes and burning plastics.
- It was hot when the event happened, many residents had to leave their homes because of the fumes, and those that chose to stay and follow shelter in place advisories suffered high heat exposure because they didn't have air conditioning.
- Explained her understanding of incident command structures but wants these incident specific organizations to do a better job of sharing information.
- Shared her observation that the region was unprepared for communicating and notifying residents promptly due to inadequate incident command procedures, expressed her desire that emergency response plans be in place, and that improvements are made collectively to mitigate impacts / ensure diligent communication.
- Committed to continue to work closely with the County Office of Emergency Services and San Diego APCD staff in her capacity as Chair of the San Diego APCD and Vice Chair of the County Board to ensure that they have better, efficient, and transparent notification plans.
- Thanked the Environmental Health Coalition for their quick actions during their first hours of the fire to receive complaints and connect to APCD staff.

Summary of Diane Takvorian's comments:

Diane Takvorian offered her gratitude for all who made the meeting possible, provided her background/role, expressed her opinion that the meeting was a result of a massive system failure to protect public health during the fire, and expressed her appreciation for the opportunity to evaluate the response to improve emergency preparedness and better protect public health during emergencies. She described concerns, provided a summary of the actions EHC took in response to the fire, and proposed ways to improve emergency preparedness:

- Community members reported being overwhelmed by the odors throughout the first day of the fire.
- Many residents stated they had to leave their homes because of the fumes, they didn't have air conditioning, and the residents who had to remain in their homes had headaches, nausea, and high levels of anxiety because they didn't know what was going on.
- EHC worked with the Mayor of National City to develop a 7/12/20 ~2:30 pm bilingual social media statement for residents to shelter in place because the Mayor did not receive any other official notifications (the

National City statement was the only one to come out for hours from any organization). She further explained that the next notice did not come out until later that evening – residents were left not knowing anything, except for some television interviews saying that there was not a problem; however, everybody noticed a horrible smell that indicated that there was a problem.

- A collaborative effort was launched within 24 hours that included National City Mayor, SD City Council District 9, EHC, 211, and the Port of San Diego to provided 200 hotel rooms by the third day of the event to protect residents from the fire's smoke.
- The need to improve collaboration and coordination to improve emergency preparedness.
- The communities impacted by the fire are those that are already impacted by some of the highest levels of air pollution in San Diego County and the State.
- EHC's commitment to work with all the agencies present at the meeting to develop a system that addresses the needs of community members, enables them to have good information to better protect themselves, and ensure access to resources that government agencies are likely to provide.

Community Engagement

Community members from Logan Heights and East Chula vista commented in the meeting chat that they too were impacted by the fire (Comments made around the time that Diane Takvorian was discussing the cumulative impacts of the fire and ongoing high levels of air pollution in San Diego County and the State).

Introduction and Overview

Ken Stroud, Chief, Community Air Monitoring Branch, CARB

Ken Stroud provided the background of the fire/response review process, the additional analysis of the data collected during the fire, the assessment of potential health impacts preformed, and overview of the meeting agenda.

Community Engagement

A community member from Logan Heights suggested during the overview of the agenda that joint "Ready Navy" training can be held with residents patterned on what CERT San Diego offers.

The meeting facilitator provided a link to the presentations for the meeting, acknowledged the chat comments made during Diane Takvorian's opening remarks about other communities also being affected by the fire, and conducted surveys on where attendees lived, how long they have lived in the community, and their affiliations:

Poll Question

Where do you live/work in the community? (37 of 74 – 50% participated):

- National City (8/37 – 22%)
- Barrio Logan (4/37 – 11%)
- Logan Heights (3/37 – 8%)
- Southcrest (0/37 – 0%)
- Golden Hill (1/37 – 3%)
- I do not live/work in the community (21/37-57%)

Note – Chula Vista was missed on the poll question.

Poll Question

How many years have you lived/worked in the community? (30 of 73 – 41% participated):

- 0-5 (5/30 – 17%)
- 6-10 (2/30 – 7%)
- 11 -20 (3-30 – 10%)
- 20 (9/30 – 30%)
- I do not live/work in the community (11/30 -37%)

Poll Question

Are you joining us tonight as a: (38 of 73 – 52% participated):

- Resident and Community Member (5/38 – 13%)
- Environmental Organization Representative (7/38 – 18%)
- Agency Representative (23/38 – 61% participated)
- Elected Official (2/38 – 5%)
- Other (2/38 -5%)

During the survey on affiliations, one attendee commented in chat he is from the Port of San Diego. Also, Diane Takvorian responded to a resident of Logan Heights earlier chat comment that her suggestion for grant or reimbursement process for air purifiers for the surrounding neighborhoods is coming soon and to contact Letty at EHC for more information - LeticiaA@environmentalhealth.org.

During the facilitator's introduction of the next speaker Alicia Sanchez, one attendee commented in chat that she lived in Logan Heights and worked in National City.

Community Perspective

Alicia Sanchez, Resident of National City and Alejandra Sotelo-Solis, National City Mayor

Summary of Alicia Sanchez' Comments

Alicia Sanchez shared her personal experiences during the fire, its impacts on her husband's existing medical condition, the rapid/abnormal accumulation of black particles on the filter of his medical breathing equipment, and her concerns about the fire:

- The anxiety caused by the lack of initial information about the incident (she didn't' receive any information until the second day of the incident).
- She accepted assistance to move from her home to escape the smoke but fears the damage had already been done.
- Inquired how will things be different for future incidents.
- Described existing cumulative impacts of ongoing pollution in her neighborhood from mechanical workshops and other sources.

Community Engagement

An EHC representative agreed with suggestions made earlier in chat about the need or grant or reimbursement process for air purifiers for the surrounding neighborhoods and provided her contact information: Leticia@environmentalhealth.org, 619.474.0220 ext. 121.

Two meeting participants thanked Alicia Sanchez for her testimony.

Summary of Mayor Alejandra Sotelo-Solis comments

Mayor Sotelo-Solis described her experiences during the fire and past similar incidents – highlighting the point that the community needs to be careful of the ongoing threat from toxic air contaminates from unplanned releases. She then provided details of the actions she took as the Mayor of National City, as well as continuing efforts:

- Contacted EHC, several community partners, and her emergency personal to assess the situation and confirmed it was the naval vessel fire (there were explosions and black smoke coming from the Bonhomme Richard).
- Heard the fire was spreading, there was fear/anxiety, and contacted the National City Fire Chief, Police Department Chief, and City Manager to respond to the incident – they provided a 7/12/20 2:30 pm statement "Please shelter in place".
- Explained the shelter in place advisory was complicated by COVID-19 facial covering requirements and the heat wave at the time of the incident (Many of the homes in the surrounding community don't have forced air due to their age – forcing residents to choose between breathing toxic air or enduring excessive heat).
- Summarized the actions taken by National City to respond to the incident:

    - Assisted Naval Base San Diego in firefighting via a mutual aid memorandum of understanding (MOU).
    - Committed to work with the base via the MOU to ensure that the city's public safety personnel will have a plan for similar emergencies to improve notification and communication procedures.
    - Inquired who is going to sound off the alarm next time we have an emergency.
    - Worked with the Port of San Diego to use their emergency impact funds to provide 200 hotel rooms out of the smoke plume to affected residents (emphasizing that 211 allowed the city to coordinate relocation with residents).
    - Described ongoing efforts to obtain air filtrations systems and expand the air monitoring network.
- Expressed the need for accountability - having open communication and access to true air readings in real time that affect the communities that are already impacted by particulate matter and pollution from major transportation corridors.
- Thanked CARB and EHC Director Takvorian for the public meeting and her desire to improve emergency coordination/communications readiness for any potential future incidents.

Community Engagement

Diane Takvorian thanked Alicia Sanchez via chat during the Mayor's statements for her fantastic testimony, while Alicia expressed her gratitude for all the positive feedback.

A CSC member stated in chat during the Mayor's closing remarks on the need to improve emergency coordination/communications readiness that prevention measures are also essential.

The facilitator surveyed the attendees on their location during the fire and all their methods of learning of the fire:

Raise Hand Question

Were you in town when the fire happened? - a lot of people responded.

Poll Question (Select all that apply)

How did you receive instructions on how to protect yourself from the smoke? (18 of 69 – 26% participated):

- Personal observation (6/18 – 33%)
- 211 (0/18 – 0%)
- Navy speaker/siren system (3/18 – 17%)
- AlertSanDiego (0/18 – 0%)

- News media (3/18 – 17%)
- Social media (5/18 – 28%)
- Local community leaders (4/18 -22%)
- Friends, family, neighbors, coworkers (7/18 – 39%)
- San Diego Air Pollution Control District (4/18 – 22%)
- Other local response agencies (1/18 – 6%)
- Other (0/18 0 0%)

The facilitator shared the suggestions made earlier in the meeting in chat:

- A joint Ready Navy Training to be held with residents, something like CRT San Diego offers.
- A summary of the earlier chat thread on a grant or reimbursement process for air purifiers for the surrounding neighborhoods – it is in the works and acknowledged the contact information provided.

Air Monitoring Response Review

Charles Pearson, Manager, Incident Air Monitoring Section, CARB

Charles Pearson gave a summary of the San Diego Air Pollution Control District's response to the 2020 fire aboard the naval vessel, instruments used, and detailed discussion of the key questions the after-action review working group asked with recommendations developed to address those questions. The questions/recommendations were presented in four categories: Preparedness, coordination, response operations, and public communication:

Preparedness:

- Update and revise plans.
- Review capabilities and include in response plans.
- District should continue to conduct periodic incident training, drills, and exercises with partner agencies with an emphasis on hazards and scenarios specific to the port and other industrial areas.

Coordination:

- District and responding agencies should clearly define roles in incident response plans and operate within the incident command framework.
- District should work with local, state, and federal response agencies to strengthen and improve internal notification procedures.

Response Operations:

- The District's incident response plan should clearly define its air monitoring and reporting capabilities and how they complement those of responding agencies.
- The response plan should identify potential hazards in the District and anticipate resource needs to react to these hazards.

Public Communications:

- The District's incident response plan should clearly define its role in an incident command structure during emergencies to communicate timely, actionable messages in a format and language that the public can understand.
- Incident command structures established during emergencies should include the County Public Health Department so that coordinated messaging contains more detailed health information.

Community Engagement

A community member inquired during the question and comment period about who the incident lead was and how it is determined for all incidents. Charles Pearson, San Diego Office of Emergency Services Director (SD OES) Jeff Toney, and Harry Allen from the U.S. EPA provided the response:

- The U.S. Navy was the lead agency for the incident command structure set up for the 7/12/20 fire aboard the USS Bonhomme Richard.
- Existing local, regional, State, and federal emergency response plans describe the lead agency for incidents, depending on where the incident is located.

Jeff Toney provided more information on the emergency response structure and his office's actions during the 7/12/20 fire:

- Description of initial notifications during the incident from SD OES to National City Emergency Management, City of San Diego, Chula Vista, the Navy, and the SD OES hazardous incident response team – he noted there weren't really requests coming into his office.
- Stressed the importance of establishing a unified command structure to ensure all agencies act as one and the incident commander's responsibility to establish this structure.
- The importance of early communication, SD OES' work with National City on the 7/12/20 ~2:45 pm AlertSanDiego campaign that went out to ~14,000 residents of National City, and that there were no other requests to send out early notifications.
- Expressed his concern with the low AlertSanDiego registrations in the South Bay Area, emphasized that one must opt-in to this region-wide bilingual service, provided instructions on how to sign up, and encouraged the community to do so.
- Also encourage the community to sign up for the SD emergency application on their smartphones.
- Facilitator provided link for ReadySanDiego in chat: https://www.readysandiego.org .

Harry Allen provided more information on jurisdictional authority based on the

location of incidents:

- At the federal level, the Coast Guard has jurisdiction over San Diego Bay and the oceans, the U.S EPA has jurisdiction inland, and confirmed that the Navy is responsible for this incident on their military installation.
- Explained that incidents start locally, and the responses grows as necessary to respond to them.
- Summarized gaps identified - communication and enrolment of agencies in the response to include local municipalities and other organizations, such as EHC.

The community member continued the discussion by agreeing that communication is a key point and expressed his concerns about the lack of communication of health hazards and initial information from the Navy stating there were no health hazards from the incident, and there was nothing toxic. Harry Allen acknowledged the gap in communications and the need for better coordination between responders, especially with a military incident.

The facilitator shared chat comments made during the question and comment session:

- CSC member's inquiry on what failed or wasn't in the plans that caused the failure in communications.
- EHC member's comment that during emergencies, people will not have the time to figure out who to call, they just expect immediate help.

Health Impacts

Barbara Weller, Manager, Population Studies Section, CARB

Barbara Weller gave a presentation on the health impacts of the USS Bonhomme Richard Fire:

- Discussion centered on what is known about the impacts of fire on health, with most of the information gathered from wildfire impacts, while very little is known about ship fires.
- Discussion of factors that affect the pollutants released by fires such as the temperature of the fire and the material that is burned with less well-known about structural fires and the toxic compounds that may be burned.
- Overview of community concerns including the restriction of remaining indoors during fire, although CARB always recommends that people take shelter to reduce exposure and protect their lungs from the effects of PM and toxic compounds released from a fire. Discussion of impacts to sensitive groups, immediate effects of exposure, and health affects reported by the community including headache, eye, and throat irritation, coughing and sinus irritation, and the fact that these types of effects are often seen with smoke exposure.

- Description of community members most at risk including seniors, children and those with heart and lung disease, and pregnant women and infants. Smoke effects will be worsened by the additional stresses in under resourced communities and in communities of color who also may be exposed to higher levels of other pollutants.
- Discussion of what's in fire smoke in urban fires and burning of vehicles and structures such as ships which are known to release dangerous chemicals including toxins such as Polycyclic Aromatic Hydrocarbons, Volatile organic compounds, and metals.
- Details on one component of fire smoke – Particulate Matter (PM2.5) and its harm to health (including graphic from EHC on relative size of PM2.5 to human hair).
- Overviews of public health impacts of PM2.5 and toxins, including both respiratory and cardiovascular impacts including emergency room visits, hospitalizations, and even premature death as well as mental health impacts and the concerns of lead exposure to children.
- Evaluation of air monitoring measurements during the naval vessel fire to known health values showed that while it is comforting to know that the compounds measured did not exceed current standards, many compounds were not measured, and the short-term impacts of many toxic compounds are not known.
- Health summary and conclusion of impacts from fire found that more information is need on both the short term and long-term impact of structural fires.
- Overview of ongoing CARB research on health impacts of smoke and COVID-19 explained that we are continuing to investigate these impacts on health in California.
- Listing of additional resources.

Community Engagement

The facilitator noted there were no comments, questions, or chat messages during this presentation and moved to the next agenda item to maintain meeting timing.

Air Monitoring Data Analysis

Annemarie Flores, Staff, Special Assessment Branch, CARB

Annie Flores gave a presentation of the data analyses that CARB staff performed relating to the incident:

- Overview of data collected, health standards used, behavior of the pollutants, and analysis of air monitoring conducted:
    - SDAPCD measurements.
    - EHC measurements.
    - US Navy.

- Summary and conclusions of data analysis.
- Discussion of behavior of pollutants at surface based on fuel, intensity of fire, and weather.
- Analysis of metrological and air quality modeling on data.
- Lessons learned from analysis.

Community Engagement

Facilitator provided links to additional resources in chat during the presentation:

- Wildfire information from CARB - https://ww2.arb.ca.gov/wildfire-emissions .
- Wildfire information from AirNow - https://www.airnow.gov/fires/ .
- Slides for the meeting's presentations - https://ww2.arb.ca.gov/resources/fact-sheets/uss-bonhomme-richard-fire-post-incident-review-public-workshop .

Facilitator reviewed two questions posed in chat during the presentation on when the air samples were taken and how long after the fire they were taken:

- Domingo Vigil from APCD replied in chat that they began monitoring VOC levels on 7/12/20 at 8:30 p.m. and particles at approximately midnight.
- Annie Flores explained the Navy data on Slide 5 of the presentation data was obtained from 7/12/2020-7/20/2020.
- David Sodeman, Chief of APCD's Air Monitoring Division, further explained that they started VOC sampling on 7/12/20 and continued sampling until several days after the fire was extinguished. He also explained the time necessary to collect the samples in the field and take them back to the laboratory for analysis.

Another meeting attendee noted that the hourly PM 2.5 hourly data shows exceedances of the 24-hour standard at several stations, asked how a conclusion can be made that the data did not exceed any health standards, and further stated his concern that hourly data twice the 24-hour limit could cause short term health consequences. Barbara Weller answered and explained there have been several studies of short-term health impacts but not from the impacts of smoke from a fire aboard a naval vessel. She explained that while it is comforting that the 24-hour standard was not exceeded, there is not enough information, including the lack of health standards for many of the toxics involved, to emphatically say there were no health effects. She also acknowledged the reported impacts from the community. During Barbara's answer, an EHC member commented in chat that, while we know that trees and other organic materials burn during wildfires, we do not know what was burning on the ship. The facilitator then echoed the chat comment on what was burning on the ship.

Later in the meeting, Diane Takvorian posted in chat that Dr. John Balmes, a CARB Board Member for public health, emphatically expressed via the media that the fire presented a health hazard to the community in response to the Navy's declaration that no health hazard was present. Bonnie Holmes-Gen continued the ongoing chat thread by agreeing that fire and smoke always present health hazards and this was covered in Barbara's presentation, and later added that ship and structure fires pose added threats due to toxic constituents, and that CARB always urges people to take shelter and protect themselves and their lungs in the case of smoke incidents. Diane Takvorian completed the thread by noting Barbara did acknowledge those hazards and that she was responding to the Navy's declarations that there were no hazards.

A CSC member inquired via chat during the introduction for the next agenda item where the point locations for air sampling were and the impact of winds on data collected at those locations.

Local Agency Updates (OES, APCD, USEPA, US NAVY)

Ken Stroud, Chief, Community Air Monitoring Branch, CARB

Ken Stroud provided an introduction for the agencies that will be making statements.

Summary of SD OES Comments (Jeff Toney, Director, San Diego Office of Emergency Services)

Jeff Toney provided a description of his office's role in emergency response:

- Characterized his agency as "second responders" that do behind the scenes coordination to support the first responders in the field and the affected communities for all types of hazards/emergencies.
- Explained his agency is also responsible for managing disasters in the unincorporated parts of the county and running the San Diego County Emergency Operations Center.
- Noted it was important to note that each of the County's 18 incorporated cities also have emergency managers and emergency operations centers, and in a normal response, they reach out to SD OES if an incident is beyond their capabilities to respond.
- Described the network of support for incidents beyond a local agency's capabilities from regional, State, and federal response/support agencies.
- Explained the difficulties with the naval vessel incident starting at the federal level – it's not normal when you have a disaster start at the highest level versus the local level.
- Listed the steps all the agencies can take together to improve emergency preparedness – all agencies understand the resources that other agencies can bring to the table, continue joint training/exercises, broaden the bi-annual exercises with they conduct with the Navy nuclear propulsion staff

to include more stakeholders.

- Provided notice of the work to revise their emergency response plans in 2022, the addition of APCD to the plan's Environmental Health Annex, and their planned updates to the multi-jurisdictional hazard mitigation plan.
- Stated the public can provide input on the emergency response plans/multi-jurisdictional hazard mitigation plan and committed to proving links on their website in the coming months.
- Repeated his request that the public sign up for the opt-in AlertSanDiego system and download the SD emergency application on their cell phones.

Summary of SDAPCD Comments (Domingo Vigil, Deputy Director, San Diego Air Pollution Control District)

Domingo Vigil explained APCD learned a lot during the after-action review, that the district takes the Bonhomme Richard incident very seriously, and will do everything within their capabilities to improve their response capabilities. He announced the 9/30/21 release of their incident response plan for public comment and later posted a link to it in chat. The plan will identify how it fits into incident command structures, their role as a local response agency, and some of the actions that the members of the public can take to protect themselves. He then provided more detail on the District's follow up on the incident:

- Participating in exercises and recently participated in a in a tabletop exercise with the Navy.
- Strengthening their relationships with the responding agencies, ensuring correct contact information is on file, and making sure they are more familiar with the capabilities/roles of each agency.
- Working on a public participation plan to improve and expand the district's outreach overall, as well as during incidents.
- Established communication channels with the public.
- Using $550,000 allocated by the County Board of Supervisors to purchase residential air filtration devices and indoor air monitoring systems for Port Side community members for a new program - Portside Air Quality Improvement and Relief Program.

Community Engagement

Community members and EHC staff provided positive feedback for the Portside Air Quality Improvement and Relief Incentive Program, and APCD explained they are in the final steps of hiring a contractor to manage the program with sign up information to be distributed to all attendees of the workshop.

APCD provided a link to their emergency response plan in chat later in the meeting:

https://www.sdapcd.org/content/dam/sdapcd/documents/monitoring/Incident-Response-Plan.pdf .

US EPA Comments (Harry Allen, On-Scene Coordinator)

Harry Allen provided the background of EPA's emergency response capabilities, his role, and experience in a 2002 remediation project in Barrio Logan. He provided details on:

- EPA's collaboration with CARB on incident air monitoring and their role in providing additional assistance to local and State response agencies.
- The assumption EPA made during the Bonhomme Richard incident that EPA's assistance was not needed because of their initial assessment that the APCD's response was robust compared to other community air monitoring around the state - including in the Bay Area and Los Angeles. He further characterized the District's response as the best of what air protection districts can do in the State. He also described working with the US Coast Guard and Navy to inform EPA's decision on aid.
- Described what aid EPA might have provided upon review of the incident and will work towards providing in the future; however, clarified that some of the expectations placed upon APCD, National City, Barrio Logan, and the Navy may go unfulfilled.
- Emphasized the importance of EPA coordinating and doing exercises with **local authorities/communities** due to the large area they cover (Arizona, California, Nevada, Hawaii, Guam, American Samoa, and Saipan).
- Confirmed earlier comments that EPA is the lead agency for incidents on land (except for military installations), and the Coast Guard covers pollution events on San Diego Bay and the Ocean.
- Explained one lesson from the Bonhomme Richard incident was the **omission of local community and impacted agencies** and the EPA's ability to offer additional real time VOC monitoring.

US Navy Comments (Jason Golumbfskie-Jones, PE, Navy Region Southwest N-40 Fleet Environmental Coordinator)

Jason Golumbfskie-Jones thanked CARB, the AB 617 Portside Steering Committee, and the community for the opportunity to make a statement but was not able to answer questions due to the ongoing investigations. He added the Navy's aspirations to have a releasable report in the coming months and provided an update:

- The Navy sees the community's health and safety as a high priority, as they are part of the community.

- The Navy is committed to the health and welfare of their neighboring communities and is interested in meaningful feedback on how they communicate during these emergencies.
- They complete various internal and external exercises to address emergency and environmental management, and learn not only from the exercises, but also from real life incidents that happened in the southwest and throughout the globe.
- They take these lessons and incorporate them into their training to ensure continuous improvement.
- Since the incident, the Navy has incorporated some of these lessons to include discussions on teamwork, integration, and effective communication - both internally and with many of their external partners within the county and are planning future exercises to ensure preparedness for any new incidents with all their partners.
- The Navy has conducted various training exercises and invited community partners to observe established notification protocols and entered a memorandum of understanding with National City PD on law enforcement support, as well as communication during these emergencies in an incidence.
- The Navy is looking forward to continuing to build on the strong and established relationships they currently have with their partners, while also building new relationships to ensure strong communication, fortified teamwork, and most importantly, the safety of not only their sailors and personnel, but also the surrounding communities.

Break Out Session

Meagan Wylie, Facilitator, College of Continuing Education, CSU Sacramento

The facilitator described the breakout session and reviewed the questions that would be asked in the break-out rooms:

1. How do you feel about what you heard tonight?
2. Do you feel that the ARB recommendations cover the area of interest to you?
3. Are there other areas that should be covered?
4. Do you feel tonight's presentation answered your questions, if not, what remaining questions do you have?

The facilitator then explained that agency staff (those from San Diego OES, the Navy, and APCD) would not join the breakout rooms, but will remain in the main room so that community members can be candid and open with the dialogue. She then ensured that all who wanted to join a breakout session room were able to do so (She had to combine Spanish Room 1 and Spanish Room 2 due to low attendance in Spanish Room 2).

Main Room Discussion during breakout sessions

Attendees who remained in the main room discussed the incident while they waited for the breakout session to end:

- Diane Takvorian expressed her hopes that local response agency responsibilities can be explored in the plan review process announced by San Diego OES to be better prepared for civilian and military incidents.
- Domingo Vigil agreed with Diane Takvorian and added the value of having tabletop exercises to better define roles during emergencies and APCD's interest in participating in more of them.
- Charles Pearson explained how the review process has improved response capabilities for future incidents, and how the EPA, APCD, OES, and CARB are working more closely together.
- Diane Takvorian shared that Charles Pearson exceeded her expectations on EHC's request for the after-action review of the San Diego Air Pollution Control District and that it should be a coordinated effort with the other agencies at the meeting.
- Domingo Vigil shared Diane Takvorian's comments at the 9/29/21 AB 617 meeting that while the focus of the after-action review was APCD, the process helped the District better understand the roles of other response agencies and his agency's desire to include community-based organizations (CBOs) and the public in tabletop exercises because the CBOs are more in touch with their communities.
- Paula Forbis agreed that while it is the response agency's responsibility to get information out in an incident, CBO's can help with communication and provide valuable input during tabletop exercises.
- Harry Allen explained how the Bonhomme Richard fire increased their focus on community air monitoring and how they did not pay much attention to the fire because of APCD's strong response. He described EPA's abilities to do real time VOC monitoring and how it was used in response to a 2019 train derailment in Tempe, Arizona.
- Charles Pearson explained that he did not expect the ship to burn as long as it did and how the response could have been stronger.
- Harry Allen explained how the regional response team (RRT) was activated for the Bonhomme Richard fire and how other agencies and CBOs are welcome to join the team to strengthen response. He explained how the briefings at the activated RRT gave the EPA the impression that things were more under control than they were. He added that the RRT was not activated for other responses, like the 2012 Chevron Richmond refinery fire or similar events, but that they should be. He then provided a link to the RRT website later in chat - https://nrt.org/site/site_profile.aspx?site_id=114 and offered to do an exercise for APCD upon their request. Charles shared CARBs interest in joining the exercise along with emergency response partners at Cal EPA.

Reconvene and Breakout Session Report Outs

The facilitator reconvened the attendees from the break-out sessions and had the hosts provide reports of the discussions:

English Room 1 Report Out (Ken Stroud)

Ken Stroud summarized what attendees in his breakout session discussed:

- Liked being informed about what has been done so far and the next steps, but there were some disappointments in the data analysis – they believed there's more that we can learn from this incident.
- Discussion of metal emissions did not include Chromium 6 – likely emitted from a burning ship made of stainless steel.
- Mental health considerations due to the stress from the incident.
- The incident provided trauma informed educational opportunities.
- Concerns about fallout from the smoke contaminating playgrounds and gardens, the unknown impacts from this type of exposure, and suggestions that the Navy should do some testing for this exposure.
- Inquiry if the San Diego County OES identifies other sites that can cause a similar air pollution disaster, including sites across the border, such as a tire fire.
- Inquires on the impact to the tide land and water impacts, whether direct, or from smoke fallout.
- The meeting format was good, it was good to have so many agencies represented, but there was a desire to have more discussion of communications and bring in a communications expert.

English Room 2 Report Out (Katie George)

Katie George summarized what attendees in her breakout session discussed in addition to the comments from English Room 1:

- Interest in joint emergency response training (ReadySanDiego - joint emergency plan - like CERT San Diego).
- Concerns about the disparity about what was communicated about monitoring data available during the fire versus what was presented at the meeting – promoting a short discussion of different monitoring tools.
- Interest in the Navy's training Program.
- Desire for more information on how concentrations are monitored / modeled and who would be a point of contact to learn more about this.
- Other pollution concerns, such as trucks driving through the neighborhood.

Spanish Rooms 1 & 2 Report Out (Karina Aguilera and Fernando Amador)

Karina Aguilera and Fernando Amador summarized what attendees in their

breakout session discussed in addition to the comments from English Room 1 & 2:

- Inquiry on why it took so long to hold the public meeting.
- Statement it is good there is preparation taking place so a situation like this does not occur again.
- Observation that they didn't answer Alicia Sanchez question "How will things be different moving forward? What is the plan to protect the community?".
- No real steps or specifics were given, and there is a need to be better prepared for another incident and provide information earlier so the community can determine a proper response.
- There was no notice to evacuate early in the incident to avoid breathing dangerous air.
- The fire lasted a long time, was persistent, and people were exposed to toxic air for the duration.
- A resident in Chula Vista (15 miles south of the incident) noted the smell of the smoke was so terrible that it seemed as if she were next to the incident and didn't receive any news until hours later.
- The Navy's statement that the smoke was not toxic or serious was misinformation, premature, and contradicted information from other sources.
- An emergency fund should be in place to have the ability to immediately provide hotel rooms to those affected.
- The many sources of air pollution and their cumulative impact was not discussed adequately.
- Suggestion that CARB should include in their report that procedures should be in place to avoid inaccurate and contradictory information being reported to the community.
- The many sources of pollution and their cumulative impacts were not considered or discussed adequately.
- The community wanted the Navy to say more - they had no report which was perceived as insulting.

Conclusion

Ken Stroud, Chief, Community Air Monitoring Branch, CARB

The facilitator reminded the attendees of the hyperlinks shared in chat throughout the course of the evening (including APCD's incident response plan that is open for public comment until October 28), how to save the meeting's chat log, and introduced Ken Stroud for closing remarks.

Ken Stroud reminded the attendees that the meeting was recorded and that the recording / meeting materials will be available on CARB's website. He then

explained that CARB will use the meeting comments to revise the draft review of APCD's response and then make it available for public comment, with a goal of completing the report by the end of the year. Lastly, he gave Katie George's contact information for any further comment or questions.

Table D-1: Public Comments on Draft After Action Report with CARB's Response

Source	Comment	Response
May 24, 2022 EHC Letter "RE: After Action Review of San Diego County's Air Monitoring Response to the July 2020 USS Bonhomme Richard Navy Ship Fire"	The report should make it more prominent that there were gaps in the air monitoring data and that due to this data gap it is very difficult to provide a true picture of what toxics the Portside Communities may have been exposed to and what health impacts families may have suffered. It should note that data considered "under health standards" is not complete. The proof that the "under health standards" is not fully accurate are the countless community's stories about the symptoms they experienced such as headaches, throat and eye irritations, and severe coughing among other symptoms.	Revised Section, *"Analysis of Incident Air Monitoring Data and Health Perspective"* to further explain that gaps in the air monitoring data make it difficult to provide a true picture of exposure to smoke from the 2012 fire. Added references for information on toxic particulate matter generated during incomplete combustion of heterogeneous combustible material to Appendix B.
	CARB should request all participating agencies including SD OES, EPA, and Navy to provide a report to CARB within 1 year detailing how they have been actively working on improving their emergency response, communications, community notification systems and most importantly how they continue to work together.	Replied to May 24, 2022, EHC letter that the San Diego County Board of Supervisors, who oversee the agencies responsible for the risk management and emergency response planning functions in the area, would be a more appropriate venue to request an update from all participating agencies on their activities to improve risk management and emergency preparedness activities since the fire.

May 24, 2022 Environmental Health Coalition Letter to CARB

May 24, 2021 [*sic*]

VIA ELECTRONIC MAIL

Russ Bennett
Community Air Monitoring Program
Incident Air Monitoring Section
Monitoring and Laboratory Division
California Air Resources Board
1001 I Street
Sacramento, CA 95814
cam@arb.ca.gov

RE: After Action Review of San Diego County's Air Monitoring Response to the July 2020 USS Bonhomme Richard Navy Ship Fire

Dear Mr. Bennett,

Environmental Health Coalition (EHC) is writing to acknowledge CARB's staff for a thorough evaluation of the air monitoring and response by local agencies to the USS Bonhomme Richard Navy ship fire, an environmental disaster that lasted for days and affected so many families and children living within the San Diego Portside Communities. The *After Action Review of San Diego County's Air Monitoring Response to the July 2020 USS Bonhomme Richard Navy Ship Fire* is a comprehensive report with clear recommendations on how to improve our region's emergency preparedness, response and strengthens monitoring for future air quality disasters.

EHC applauds CARB's hard work in opening the lines of communication among the various agencies and for diligently working with them throughout these past two year to implement better protocols and practices within their agencies. We, especially, acknowledge APCD efforts to provide efficient, transparent and community friendly monitoring information to our EJ communities. APCD's plan to establish a Public Information Officer/Community Outreach Organizer to assist with outreach during future incidents is brilliant!

MOVING FORWARD

Below you will find additional comments for your consideration.

- The report should make it more prominent that there were gaps in the air monitoring data and that due to this data gap it is very difficult to provide a true

picture of what toxics the Portside Communities may have been exposed to and what health impacts families may have suffered. It should note that data considered "under health standards" is not complete. The proof that the "under health standards" is not fully accurate are the countless community's stories about the symptoms they experienced such as headaches, throat and eye irritations, and severe coughing among other symptoms.

- CARB should request all participating agencies including SD OES, EPA, and Navy to provide a report to CARB within 1 year detailing how they have been actively working on improving their emergency response, communications, community notification systems and most importantly how they continue to work together.

Again, THANK YOU for your hard work throughout these past two years. Change takes time! Justice takes time! We need local, regional, state, and federal agencies to remain in close communication. These agencies need to take concrete steps to create the best emergency response system for our region in order to protect ALL families and children. EHC is here to ensure that San Diego's Portside Communities voices are heard and health protected. Should you have any questions, feel free to contact me at leticia@environmentalhealth.org, or at (619) 952.3632.

Sincerely,

Leticia Ayala
Healthy Kids Campaign Director

CARB's Reply to May 24, 2022, Environmental Health Coalition Letter to CARB

September 27, 2022

VIA ELECTRONIC MAIL

Ms. Leticia Ayala
Healthy Kids Campaign Director
Environmental Health Coalition
2727 Hoover Ave., Suite 202
National City, California 91950
leticia@environmentalhealth.org

Dear Ms. Ayala:

Thank you for your kind words in your May 23, 2022, letter recognizing the positive achievements of staff from our Monitoring and Laboratory, Research, and Air Quality Planning and Science Divisions with the release of our draft May 2022 Report, *"After Action Review of San Diego County's Air Monitoring Response to the July 2020 USS Bonhomme Richard Fire"*. We would also like to acknowledge the San Diego Office of Emergency services (SD OES) and San Diego Air Pollution Control District (District), who participated in the working group we formed to review the air monitoring response, as well as the U.S. Navy, U.S. Environmental Protection Agency, Cal EPA, California Office of Environmental Health Hazard Assessment, California Office Spill Prevention and Recovery, and California Office of Emergency Services, who were consulted during the process. To address the comments in your letter, we have revised the report by making information in its appendices more prominent in the body of the report.

We revised the Section in the main body of the report, *"Analysis of Incident Air Monitoring Data and Health Perspective"* to further explain that there were gaps in the air monitoring data that make it difficult to provide a true picture of what toxics the Portside Communities may have been exposed to, as well as the potential health impacts of this exposure. We also added references for information on toxic particulate matter generated during incomplete combustion of heterogeneous combustible material to Appendix B. While your first comment was focused on the impacts of the fire, the second seeks to improve emergency preparedness for future incidents.

At last year's public meeting, several commenters posed questions addressing emergency preparedness and the ongoing risk posed by hazardous materials in the area, with one community member inquiring how things will be different for future incidents. The answers to these questions lie with your local county environmental health and emergency response agencies. Appendix A, *"Review of Emergency Response Plans"* summarizes the emergency response plans reviewed by staff and provides detail on the capabilities, roles, and contacts of the agencies that oversee risk management and emergency preparedness in your area. Specifically, the San Diego County Department of Environmental Health, Hazardous Materials Division administers

the county's risk reduction program, while San Diego OES prepares and maintains the county's comprehensive emergency plans. We believe that the local agencies responsible for the risk management and emergency response planning functions would be better suited to lead an update from all participating agencies on their activities.

We would be pleased to meet with you if you want to further discuss the final report and our response.

Sincerely,

/s/

Charles Pearson, Manager
Incident Air Monitoring Section

Enclosure

cc: See next page.

cc Mike Miguel, Division Chief, Monitoring and Laboratory Division
michael.miguel@arb.ca.gov

Ken Stroud, Branch Manager, Community Air Monitoring Branch
kenneth.stroud@arb.ca.gov

Russ Bennett, Air Pollution Specialist, Incident Air Monitoring Section
russ.bennett@arb.ca.gov

Appendix E. Community Emergency Preparedness

Figure E1: Do you know what hazards are in your area?

Figure E2: Do you know what hazards are in your area? (Spanish)

Figure E3: Want alerts when disasters impact your area? Register with AlertSanDiego!

Figure E4: Want alerts when disasters impact your area? Register with AlertSanDiego! (Spanish)

Figure E5: Download the free SD Emergency app – ReadySanDiego.org

Figure E6: Download the free SD Emergency app – ReadySanDiego.org (Spanish)

Figure E7: Protect Yourself from Smoke

Figure E8: Protect Yourself from Smoke (Spanish)

Figure E9: Create a Cleaner Air Space

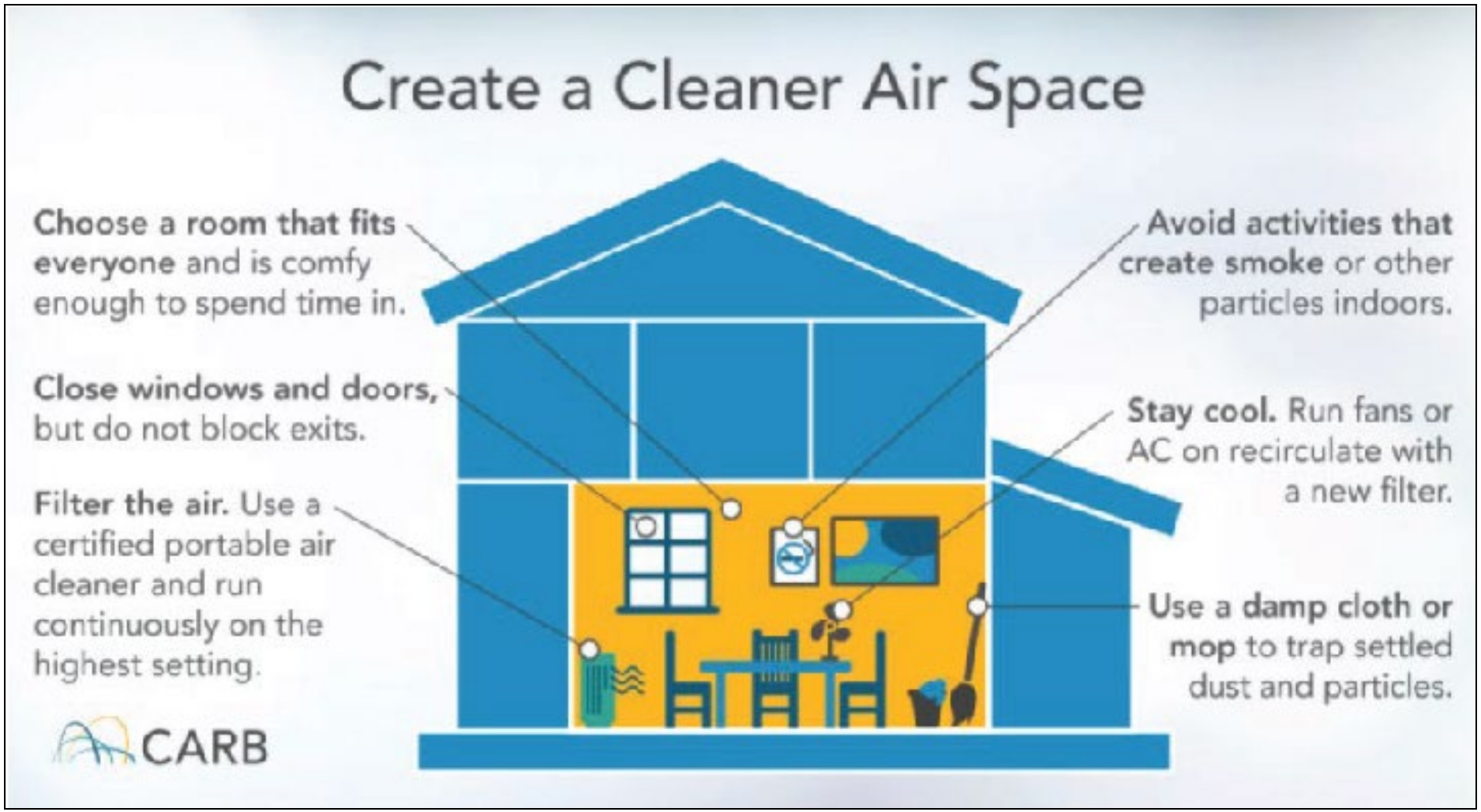


Figure E10: Create a Cleaner Air Space (Spanish)

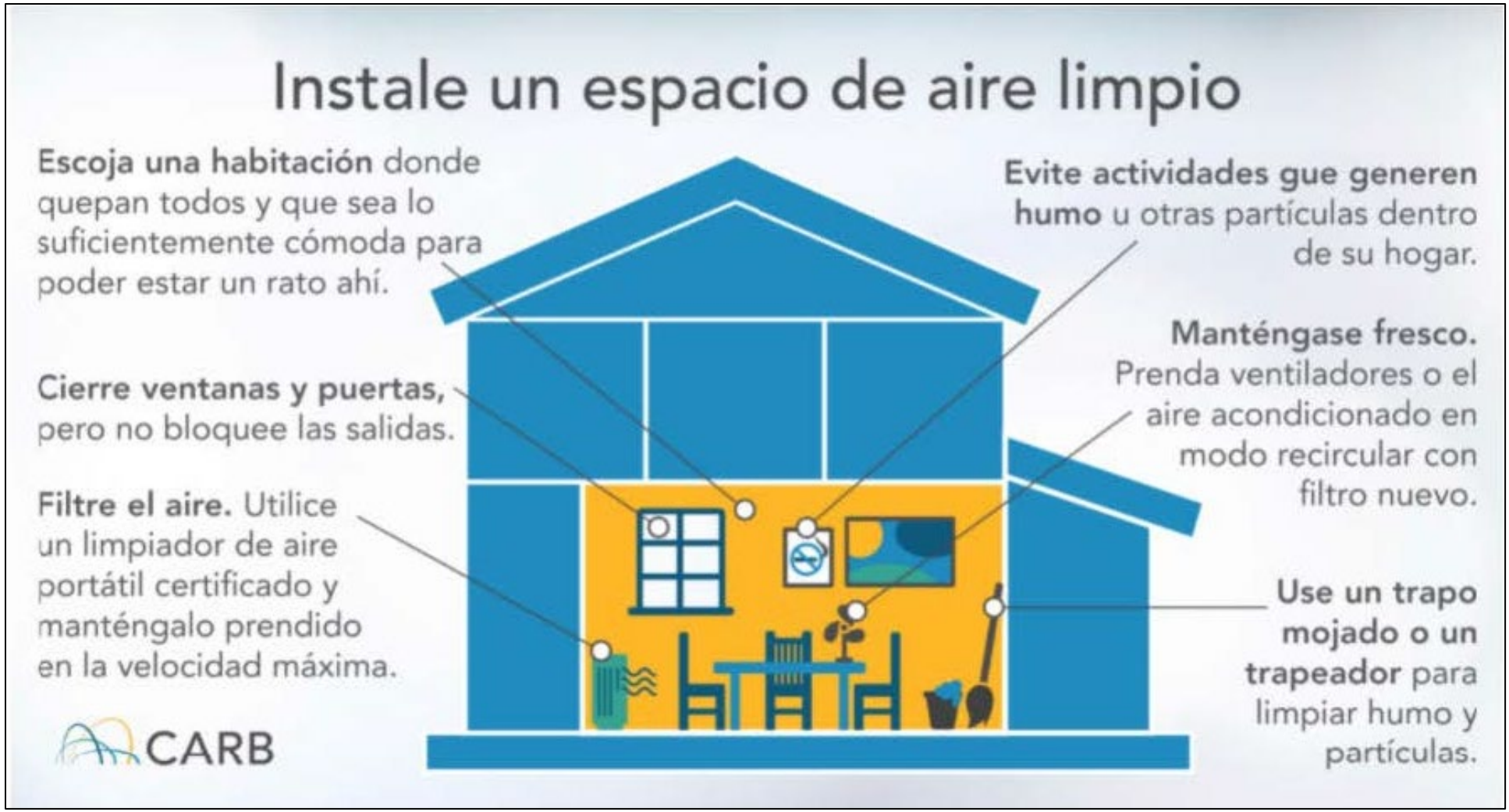


Figure E11: DYI Temporary Air Purifier

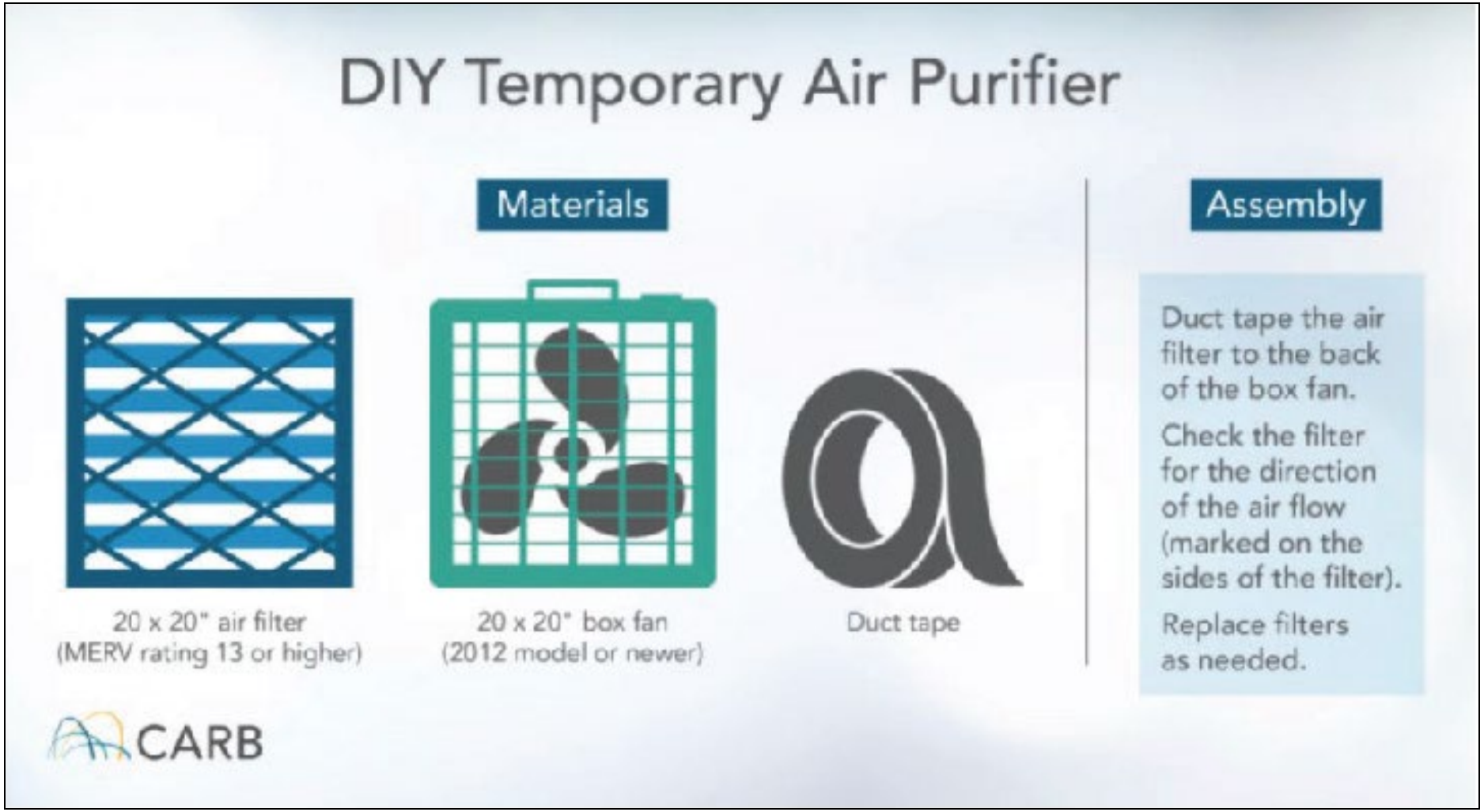


Figure E12: DYI Temporary Air Purifier (Spanish)

Appendix F. In-depth Analyses of Air Monitoring Data

Air Quality Planning and Science Division

California Air Resources Board

Glossary

AQI: Air Quality Index

AQS: Air Quality System

BC: Black Carbon

BAM: Beta Attenuation Mass

CO: Carbon monoxide

EBAM: Environmental Beta Attenuation Mass

H_2S: Hydrogen sulfide

MDL: Method Detection Limit

OEHHA: Office of Environmental Health Hazard Assessment

OSHA: Occupational Safety and Health Administration

PM_{10}: Particulate matter with diameter 10 microns or smaller

$PM_{2.5}$: Particulate matter with diameter 2.5 microns or smaller

NAAQS: National Ambient Air Quality Standards

NOAA: National Oceanic and Atmospheric Administration

NO_X: Nitrogen oxides

NO_2: Nitrogen dioxide

O_2: Oxygen

PEL: Permissible Exposure Limit

REL: Reference Exposure Level

SDAPCD: San Diego Air Pollution Control District

USEPA: United States Environmental Protection Agency

VOC: Volatile Organic Compound

Disclaimer: Reference Exposure Level (REL)

California's Office of Environmental Health Hazard Assessment (OEHHA) develops inhalation Reference Exposure Levels (RELs) that are metrics used to determine healthful levels of air pollutants. RELs are the concentration levels at or below which no adverse non-cancer health effects are anticipated for specified exposure durations: acute REL, 8-hour REL, and chronic REL. RELs are based on the most sensitive, relevant, adverse health effect reported in the medical and toxicological literature. RELs are designed to protect the most sensitive individuals in the population by the inclusion of margins of safety. Since margins of safety are incorporated to address data gaps and uncertainties, exceeding the REL does not automatically indicate an adverse health impact. (https://oehha.ca.gov/media/downloads/crnr/acuterel.pdf)

The exposure averaging time for acute RELs is one hour. For 8-hour RELs, the exposure averaging time is eight hours. Chronic RELs are designed to address continuous exposures for a year up to a lifetime. (https://oehha.ca.gov/air/general-info/oehha-acute-8-hour-and-chronic-reference-exposure-level-rel-summary)

Although RELs do not exist for shorter time periods, we use RELs to provide some context for short-term average concentrations and help the readers interpret what the data mean. Certain precautions should be taken when inferring the potential impact of good or poor air quality on health.

USS Bonhomme Richard Fire: In-depth Analyses of Air Monitoring Data

A fire broke out aboard the USS Bonhomme Richard docked at Naval Station, San Diego on Sunday morning July 12, 2020. On July 31, 2020, the Environmental Health Coalition requested the California Air Resources Board to evaluate air monitoring data collected by the San Diego Air Pollution Control District (SDAPCD).

In response to the request from the Environmental Health Coalition, California Air Resources Board staff has analyzed multiple sets of air quality monitoring data collected during the fire, including those from the US Environmental Protection Agency (USEPA), SDAPCD, US Navy, and the Portside community. This appendix presents the detailed analyses results and provides an in-depth evaluation of air quality impacts from the fire. Table 1 shows a summary of the ten air monitoring data sets analyzed in this appendix.

Table 1. Summary of the air monitoring data analyzed in this report.

Provider	Monitoring Type	Parameter	Site name	Time Period of Data Analyzed[5]	Sampling Duration
SDAPCD[6]	Routine	$PM_{2.5}$	Alpine-Victoria Drive, Camp Pendleton, El Cajon-Lexington Elementary School, Otay Mesa-Donovan, Sherman Elementary School	6/1 - 7/31, 2020	1-hr (Continuous)
SDAPCD	Routine	Black Carbon	Sherman Elementary School, 10th Ave Marine Terminal, Oceanview Blvd, San Ysidro, Chicano Park	7/1 - 8/21, 2020	1-hr (Continuous)
Portside community	Community	$PM_{2.5}$	Main St-Mercado	7/10 - 7/18, 2020	2-min (Continuous)
SDAPCD	Emergency	$PM_{2.5}$, PM_{10}	Chula Vista, Oceanview Blvd., National City	7/12 - 7/20, 2020	1-hr (Continuous)
SDAPCD	Emergency	PM_{10} Metals[7]	Marine Terminal, Chicano Park, Sherman Elementary School	7/14 - 7/19, 2020	24-hr (Filter-based)
SDAPCD[6]	Routine	NO_X	Alpine-Victoria Drive, Camp Pendleton, Chula Vista, El Cajon-Lexington Elementary School, Otay Mesa-Donovan, Sherman Elementary School, Rancho Carmel Dr, Kearny Villa Road	6/1 - 7/31, 2020	1-hr (Continuous)
SDAPCD	Emergency	VOCs (56 compounds)	22 locations within 7.5 miles from the USS Bonhomme Richard fire	7/12 - 7/19, 2020	Grab & 5-hr (Canister-based)

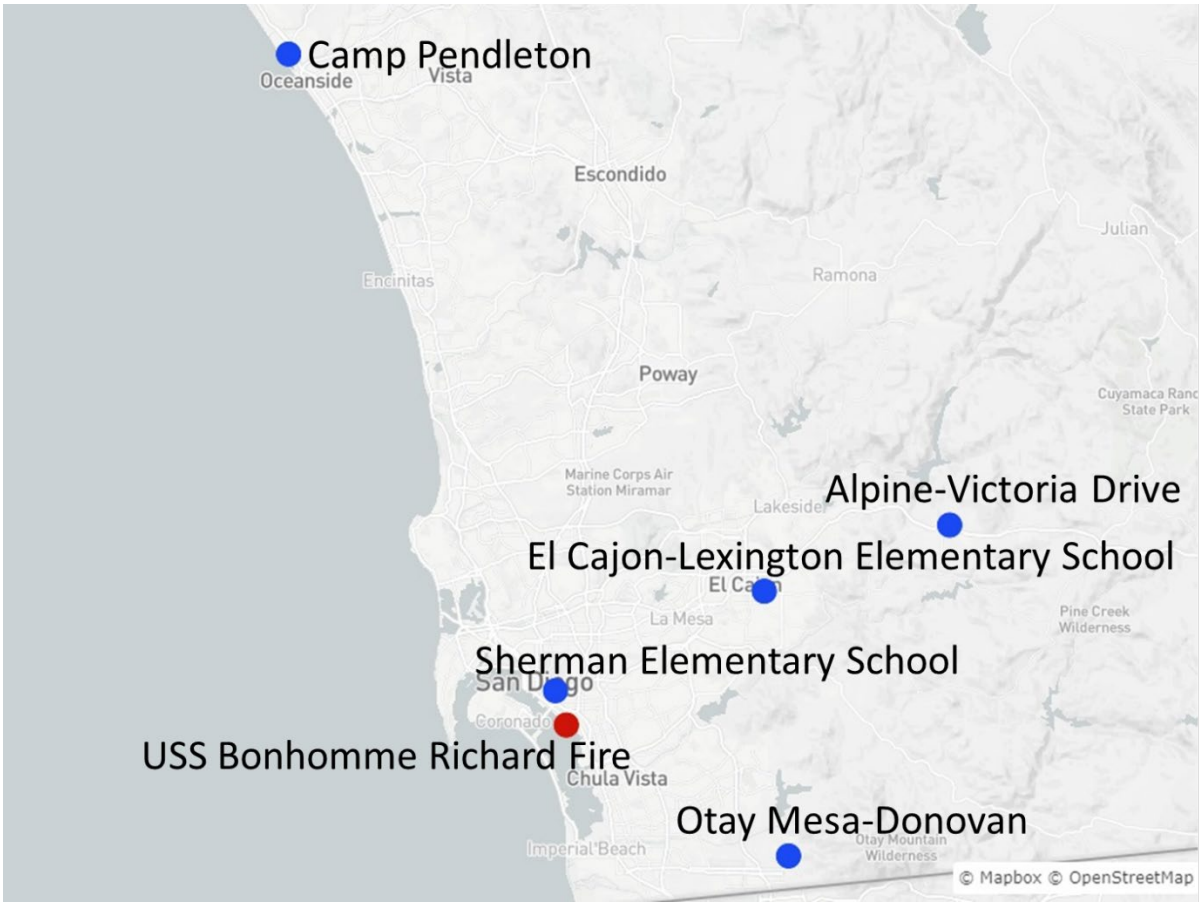
[5] For routine and community monitoring, data were collected before, during, and after this time period. For emergency monitoring, data were collected only during this time period.
[6] Data from USEPA AQS
[7] Antimony (Sb), Arsenic (As), Barium (Ba), Beryllium (Be), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Lead (Pb), Manganese (Mn), Molybdenum (Mo), Nickel (Ni), Selenium (Se), Strontium (Sr), Tin (Sn), and Vanadium (V).

Provider	Monitoring Type	Parameter	Site name	Time Period of Data Analyzed[5]	Sampling Duration
SDAPCD	Routine	VOCs (56 compounds)	Sherman Elementary School	10/25, 2019 – 12/29, 2020	24-hr (Canister-based)
US Navy	Emergency	O_2, CO, H_2S, Total VOC	6 locations within 0.2 miles from the USS Bonhomme Richard fire	7/13 - 7/20, 2020	Instantaneous
SDAPCD[6]	Routine	Wind speed, Wind direction	Alpine-Victoria Drive, Camp Pendleton, El Cajon-Lexington Elementary School, Otay Mesa-Donovan, Sherman Elementary School	7/12 - 7/19, 2020	1-hr (Continuous)

* There are two long-term Air Toxics Sampling Network sites: Chula Vista and El Cajon-Lexington Elementary School in the area. However, air toxic samples were not collected between May 2020 and February 2021, due to the COVID-19 stay-at-home order.

1. Regulatory Monitoring for $PM_{2.5}$ Data Analyses

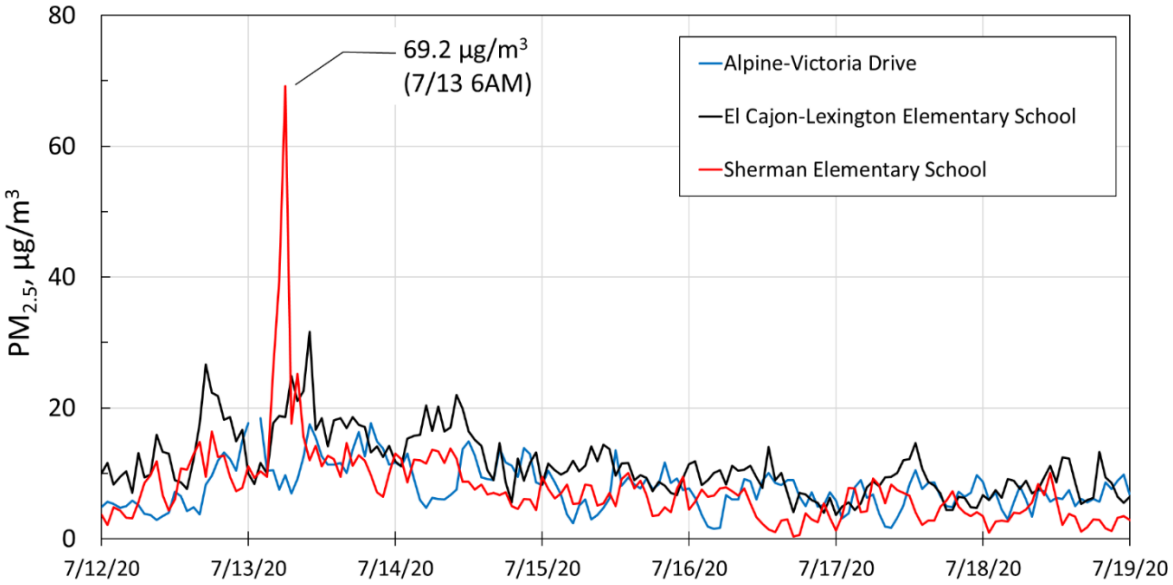
Figure 1-1. $PM_{2.5}$ regulatory monitoring sites in San Diego County.



Hourly $PM_{2.5}$ concentrations were collected with Beta Attenuation Mass (BAM) monitors at five regulatory monitoring sites[8] in San Diego County (Figure 1-1). Hourly $PM_{2.5}$ concentrations collected from three selected sites close to the USS Bonhomme Richard fire were compared in Figure 1-2. The Otay Mesa - Donovan site (2 miles from the US/Mexico border) and the Camp Pendleton site (40 miles from the fire) were not selected because they could be affected by different air pollution sources. Figure 1-2 shows $PM_{2.5}$ concentrations increased on July 13, 2020 at three monitoring sites. During the fire, $PM_{2.5}$ concentration was highest (69.2 µg/m^3) at 6 AM on July 13, 2020 at the Sherman Elementary School site and wind direction was from the south (184 degrees) where the fire was located. The USEPA 1-hour National Ambient Air Quality Standard (NAAQS) does not exist for $PM_{2.5}$.

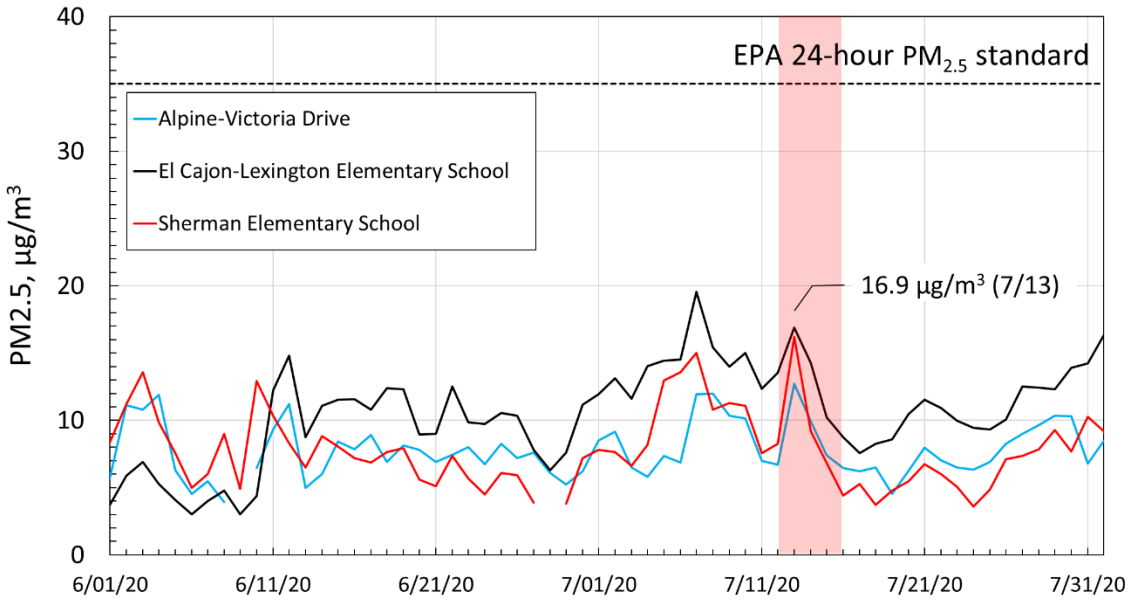
[8] Regulatory monitors are intended to provide monitoring data for regulatory purposes such as designations for the ambient air quality standards

Figure 1-2. Hourly $PM_{2.5}$ concentrations during the USS Bonhomme Richard fire at selected three regulatory monitoring sites.



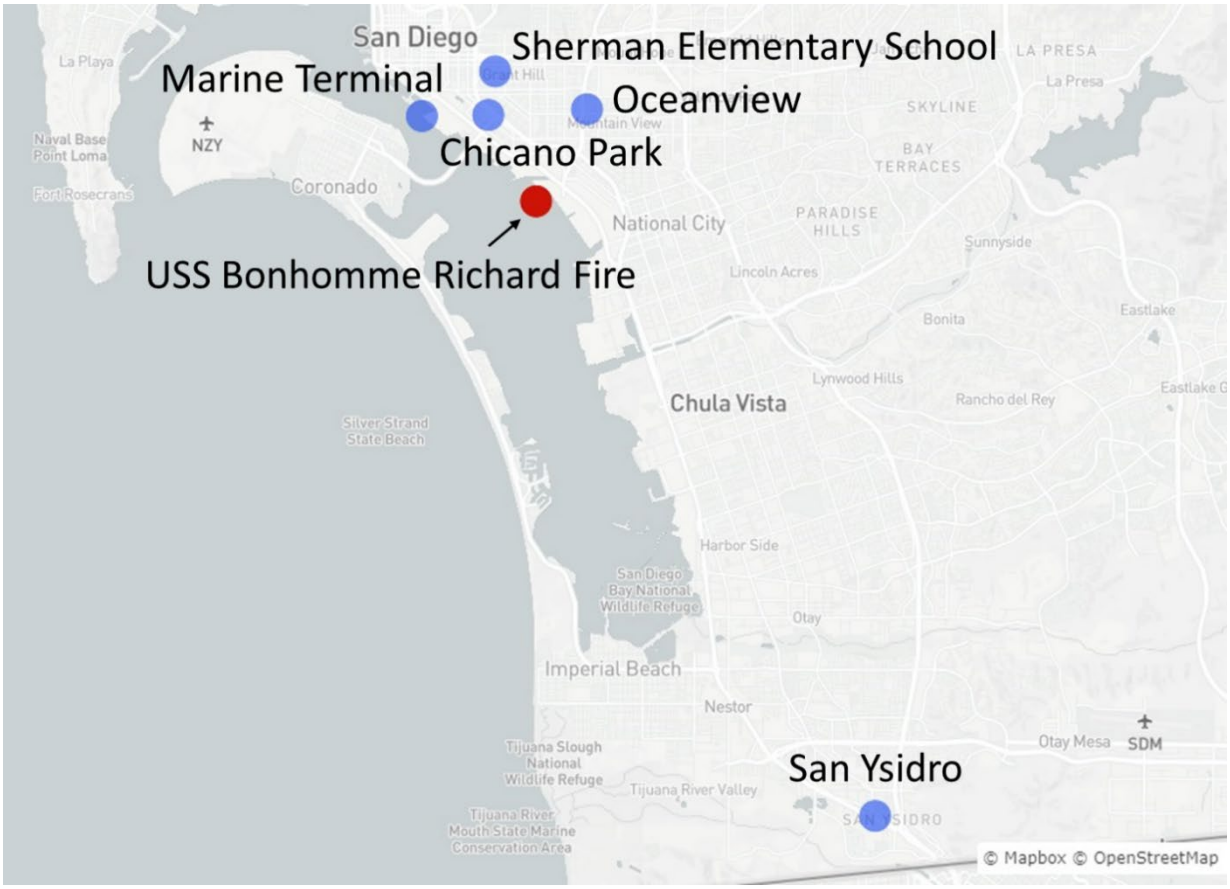
24-hour average $PM_{2.5}$ concentrations collected from three sites were compared in Figure 1-3. As shown, $PM_{2.5}$ concentrations were elevated during the fire (indicated by the red shading). However, the highest 24-hour concentration of 16.9 µg/m^3 (July 13, 2020) at the El Cajon-Lexington Elementary School site during the fire was below the USEPA 24-hour NAAQS of 35 µg/m^3. While the USEPA 24-hour NAAQS was not exceeded, there is not enough information to conclude there were no adverse health effects.

Figure 1-3. Daily $PM_{2.5}$ concentrations between June and July, 2020 at selected three regulatory monitoring sites in San Diego County (The red shading indicates the timing of the USS Bonhomme Richard fire).



2. AB 617 Community Monitoring for Black Carbon Data Analyses

Figure 2-1. AB 617 community monitoring sites for black carbon near the USS Bonhomme Richard fire.



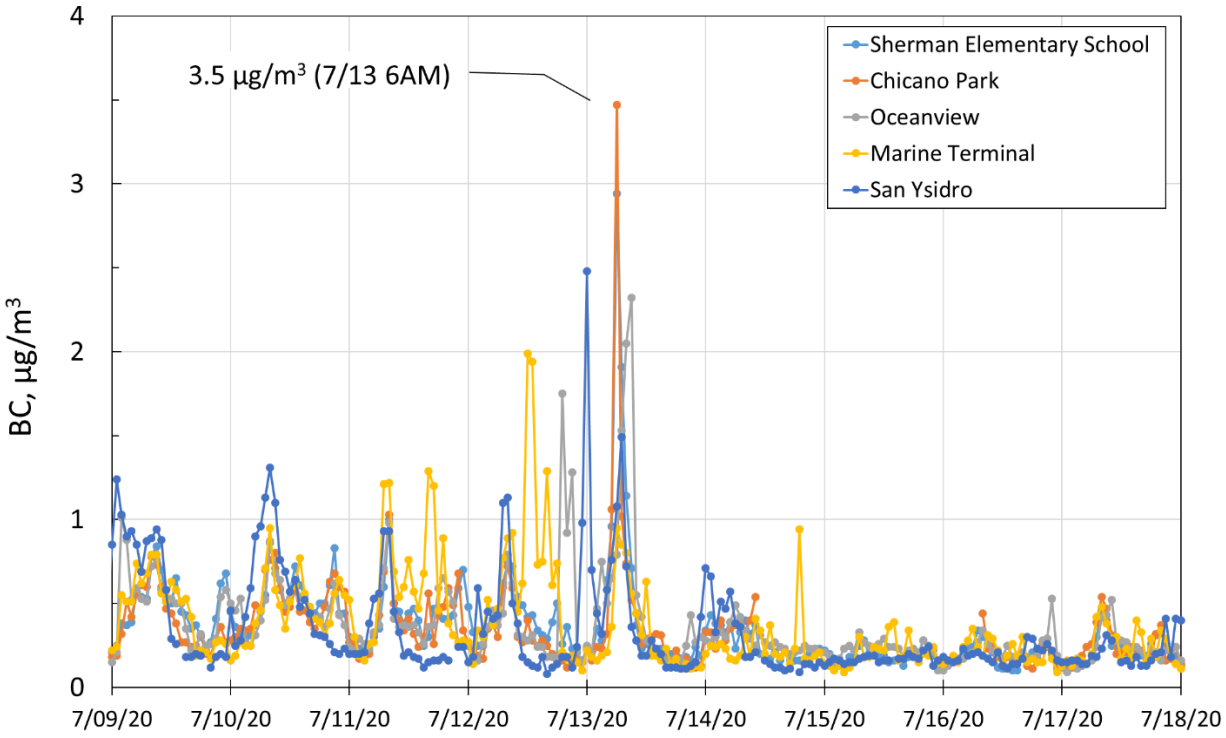
SDAPCD has been monitoring black carbon (BC) concentrations at five sites under the AB 617 community monitoring program since October 2019 (Figure 2-1). Unusual spikes in BC concentrations were observed on July 12 and 13, 2020 at all sites, with the peak (3.5 µg/m^3) at 6 AM on July 13, 2020 as shown in Figure 2-2. The BC concentrations at these sites before July 12, 2020 were lower, under 1.5 µg/m^3 for all sites. Similarly, after July 14, 2020 BC concentrations remained under 1.0 µg/m^3. This implies that the USS Bonhomme Richard fire caused a temporary increase in BC concentrations near and around the incident location for the first two days.

There is no acute REL to compare with hourly monitored BC concentrations. However, they can be compared with chronic REL for diesel exhaust particulate to better understand the health impact. If the conversion factor (1 gram BC is equivalent to 1.3 gram diesel particulate matter) from OEHHA[9] was used, the highest black carbon

[9] Portside Steering Committee Meeting January 19, 2021 (https://www.sdapcd.org/content/dam/sdapcd/documents/capp/meetings/portside-csc/011921/011921-VII-Presentation-OEHHA.pdf)

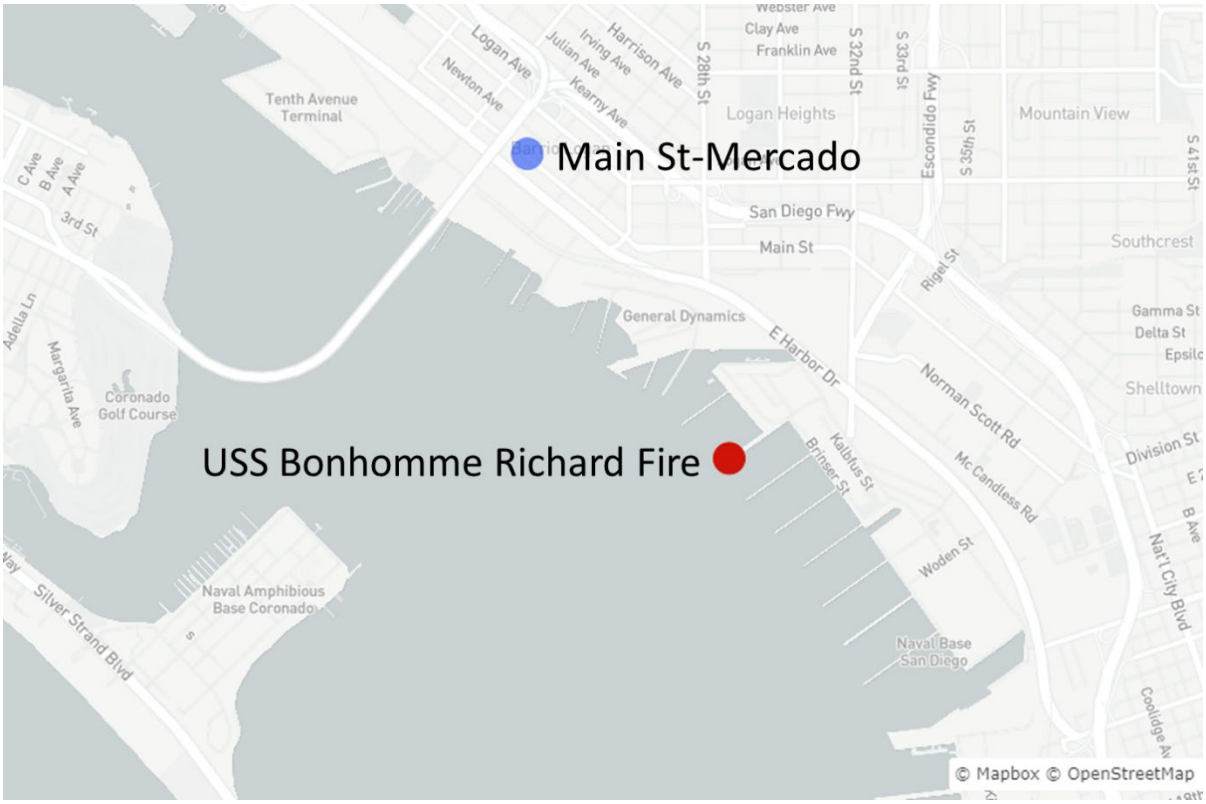
concentration of 3.5 µg/m^3 would be equivalent to 4.6 µg/m^3 of diesel particulate matter. It is still less than the 5.0 µg/m^3 chronic REL of diesel exhaust. In other words, if the exposure of 4.6 µg/m^3 diesel particulate matter concentration continued for an entire year, the chronic REL would not be exceeded. The measured levels of BC do not appear to pose an immediate threat or health hazard given the amount of time that the exposure occurred.

Figure 2-2. Hourly BC concentrations in San Diego near the USS Bonhomme Richard fire.



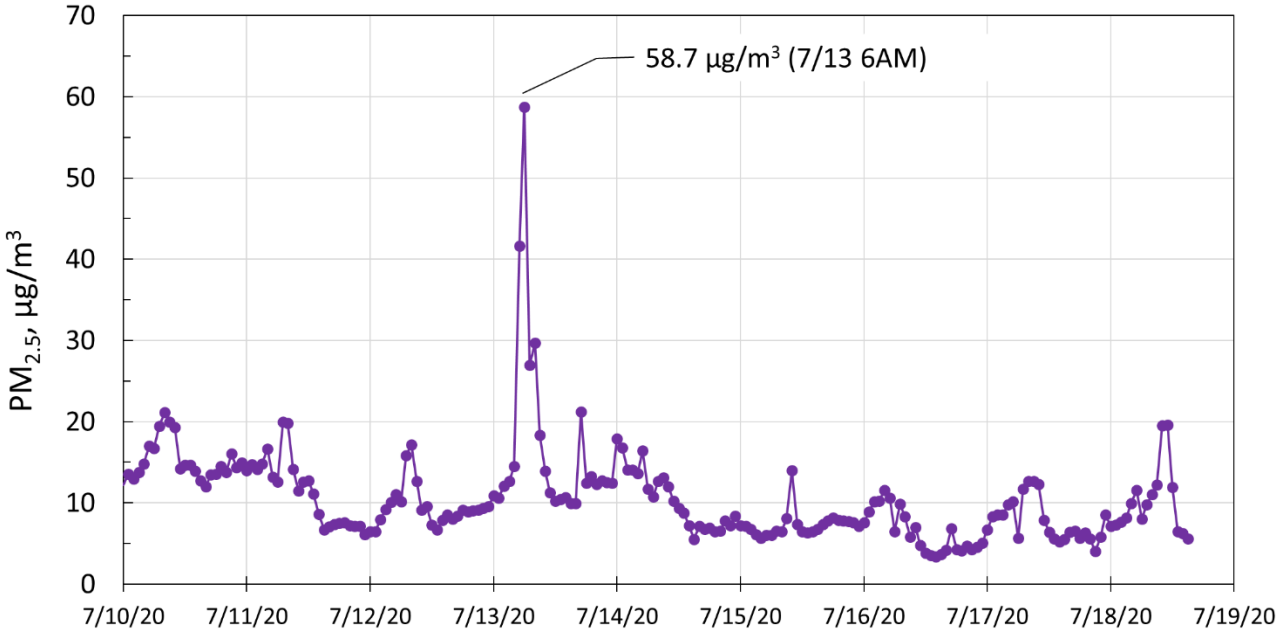
3. Community Monitoring for PurpleAir $PM_{2.5}$ Data Analyses

Figure 3-1. PurpleAir $PM_{2.5}$ monitoring site in the Portside community.



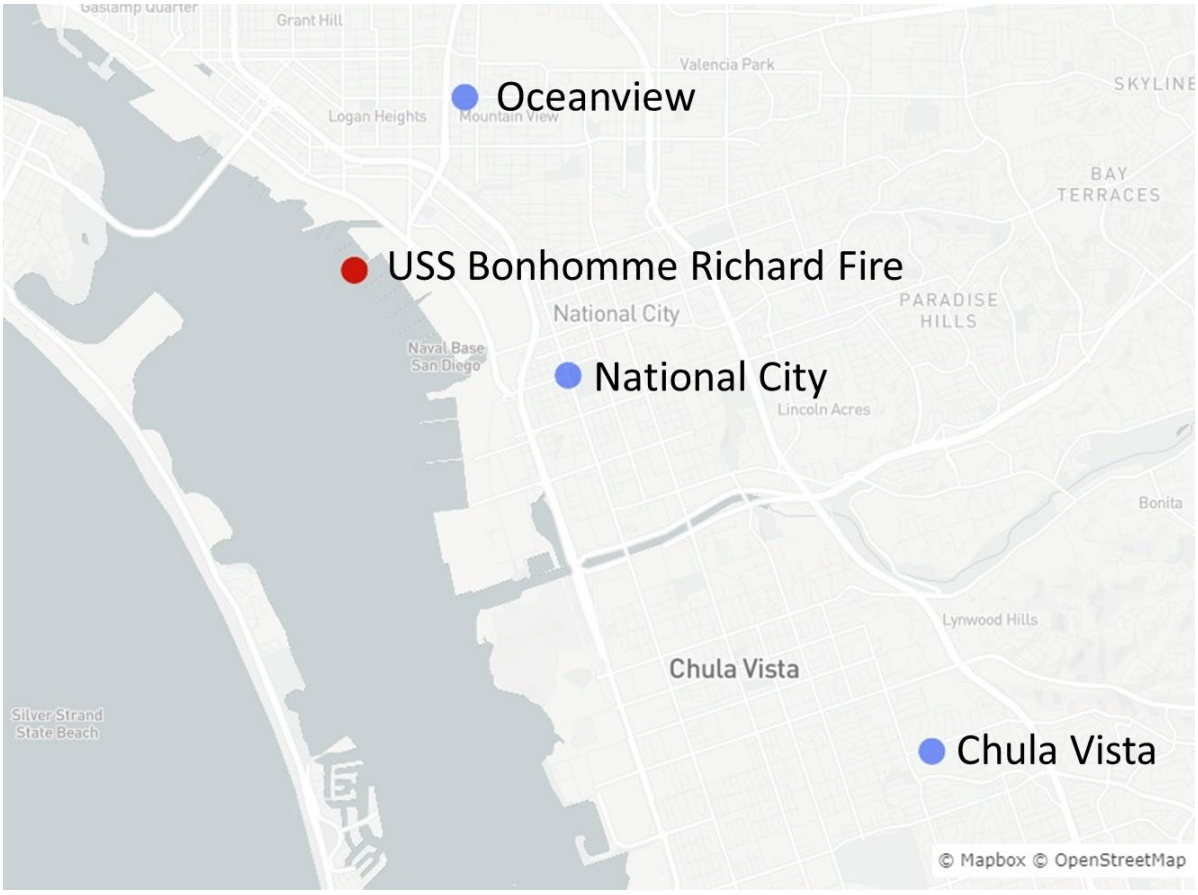
The Portside community monitors $PM_{2.5}$ concentrations using a PurpleAir monitor under the AB 617 community monitoring program at the Main St-Mercado site (Figure 3-1). PurpleAir reported $PM_{2.5}$ concentrations at two-minute frequency, but for analysis purposes hourly averages were calculated. It should be noted that the presented PurpleAir $PM_{2.5}$ data have not been adjusted with any correction factors. An unusual spike in $PM_{2.5}$ concentrations at this site was observed on July 13, 2020 as shown in Figure 3-2. The $PM_{2.5}$ concentrations at this site between July 10 and July 12, 2020, before the USS Bonhomme Richard fire, were lower and under 21.2 $\mu g/m^3$, and on July 13, 2020 $PM_{2.5}$ concentrations spiked to up to 58.7 $\mu g/m^3$. The spike in $PM_{2.5}$ concentrations on July 13, 2020 was likely caused by the fire.

Figure 3-2. Hourly PurpleAir $PM_{2.5}$ concentrations at the Main St-Mercado monitoring site.



4. Emergency Monitoring for EBAM $PM_{2.5}$ and PM_{10} Data Analyses

Figure 4-1. Emergency monitoring sites for EBAM $PM_{2.5}$ and PM_{10}.

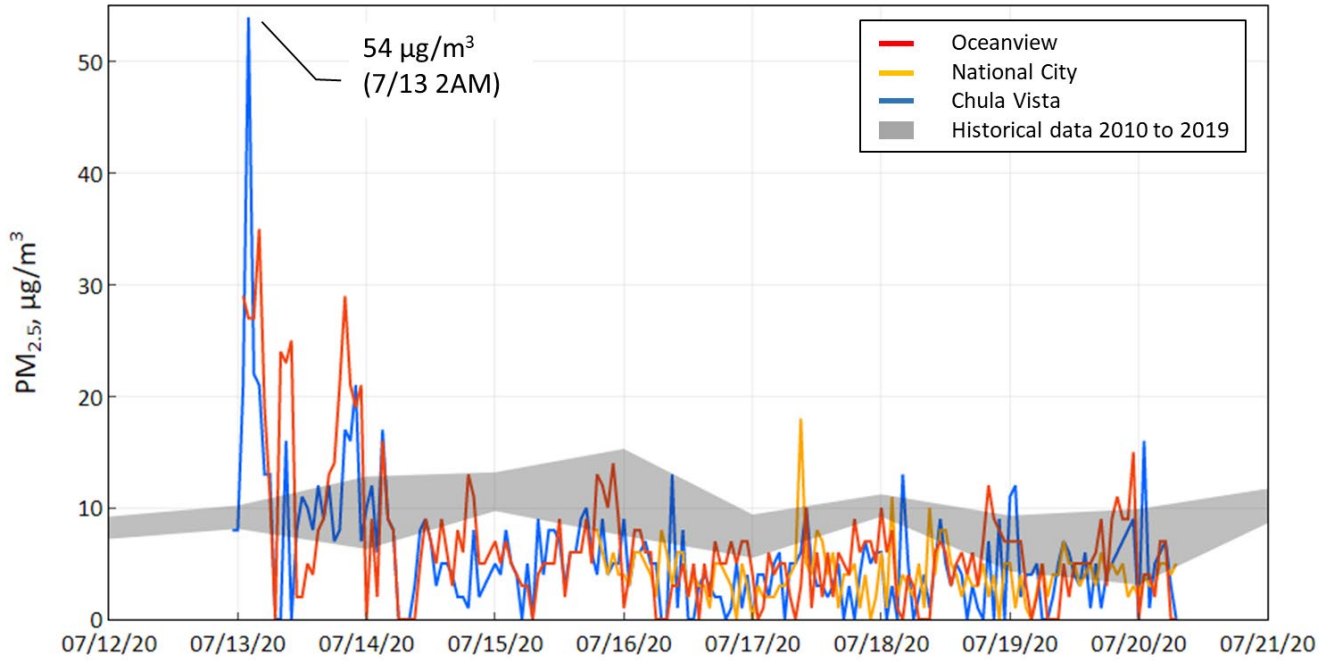


As part of the emergency air quality monitoring effort, SDAPCD collected hourly $PM_{2.5}$ and PM_{10} concentrations with Environmental Beta Attenuation Mass (EBAM) monitors at three locations near the USS Bonhomme Richard fire: Chula Vista (East J Street near Hilltop Dr., 5.5 miles SE), Oceanview (Mountain View near I-15, 1.5 miles NE), and National City (National City Blvd and Civic Center Dr., 1.8 miles SE) (Figure 4-1). The monitoring started on July 13, 2020 at both the Chula Vista and Oceanview sites and on July 15, 2020 at the National City site. The monitoring ended on July 20, 2020 at all three sites.

Figure 4-2 shows $PM_{2.5}$ concentrations increased on July 13 and 14, 2020 at both the Chula Vista and Oceanview sites. The highest $PM_{2.5}$ concentration (54 µg/m^3) was observed at the Chula Vista site at 2 AM on July 13, 2020. At the Oceanview site, the highest $PM_{2.5}$ concentration was 35 µg/m^3 at 4 AM on July 13, 2020. At the National City site, the highest $PM_{2.5}$ concentration was 18 µg/m^3 at 9 AM on July 17, 2020.

Historical 24-hour average $PM_{2.5}$ data were available at the regulatory Chula Vista site[10] as shown in Figure 4-2. The 24-hour average $PM_{2.5}$ concentration of 15.0 µg/m^3 at the Chula Vista site on July 13, 2020 was higher than the historical 24-hour $PM_{2.5}$ concentration range between 2010 and 2019, which ranged from 8.1 to 10.2 µg/m^3. However, it was lower than the 24-hour NAAQS of 35 µg/m^3.

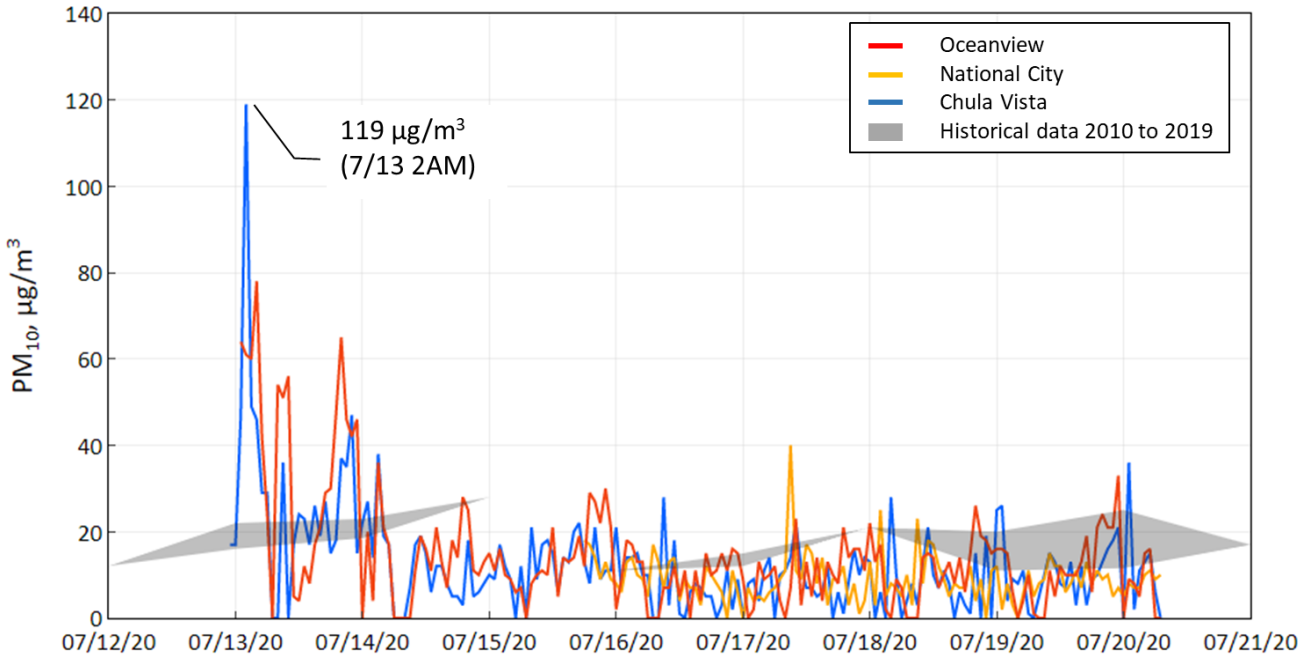
Figure 4-2. Hourly EBAM $PM_{2.5}$ concentrations during the USS Bonhomme Richard fire at three monitoring sites (grey area indicates historical $PM_{2.5}$ concentrations at the Chula Vista site between 2010 and 2019).



Hourly EBAM PM_{10} concentrations were collected at three sites as shown in Figure 4-3. As presented in Figures 4-2 and 4-3, $PM_{2.5}$ and PM_{10} show very similar temporal variations at the three sites. PM_{10} concentrations were the highest at 2 AM on July 13, 2020 at the Chula Vista site (119 µg/m^3), at 4 AM on July 13, 2020 at the Oceanview site (78 µg/m^3), and at 9 AM on July 17, 2020 at the National City site (40 µg/m^3). The 24-hour average PM_{10} concentration of 33.0 µg/m^3 at the Chula Vista site on July 13, 2020 was higher than the historical 24-hour PM_{10} concentration range between 2010 and 2019, which ranged from 16 to 22 µg/m^3. However, it was lower than the 24-hour NAAQS of 150 µg/m^3.

[10] 24-hour average $PM_{2.5}$ monitoring data at the Chula Vista site were not included in the Regulatory $PM_{2.5}$ Analyses. Only hourly $PM_{2.5}$ monitoring data were compared in the Regulatory $PM_{2.5}$ Analyses.

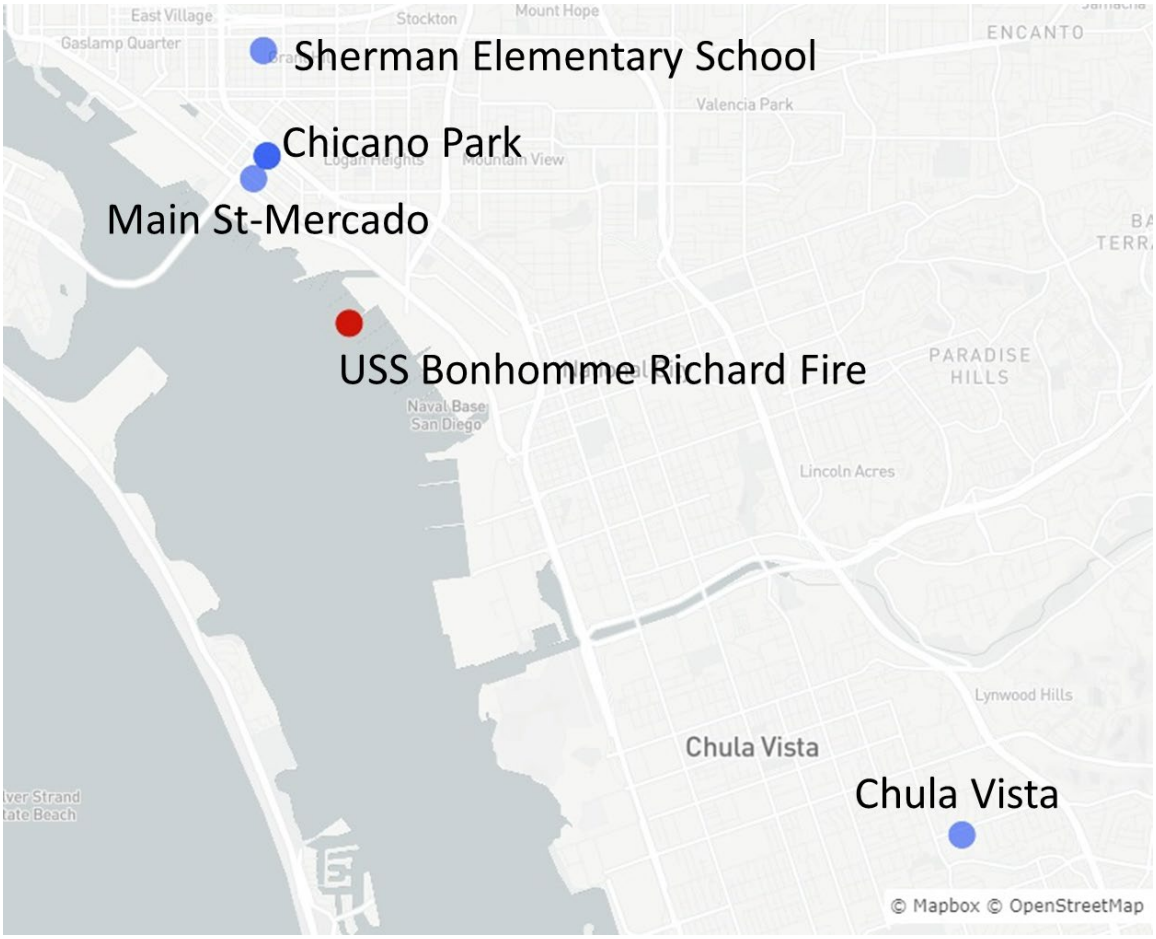
Figure 4-3. Hourly EBAM PM_{10} concentrations during the USS Bonhomme Richard fire at three monitoring sites (grey area indicates historical PM_{10} concentrations at the Chula Vista site between 2010 and 2019).



5. Comparison of $PM_{2.5}$ and Black Carbon Concentrations During the USS Bonhomme Richard Fire

To evaluate air quality impacts from the USS Bonhomme Richard fire in depth, we compared the $PM_{2.5}$ concentration data from the three types of monitors (regulatory BAM, EBAM and PurpleAir, as discussed previously), along with black carbon concentrations. The locations of each type of monitor with the highest $PM_{2.5}$ concentration, as well as the monitor with the highest BC concentration, were shown in Figure 5-1, and the concentrations were compared in Figure 5-2.

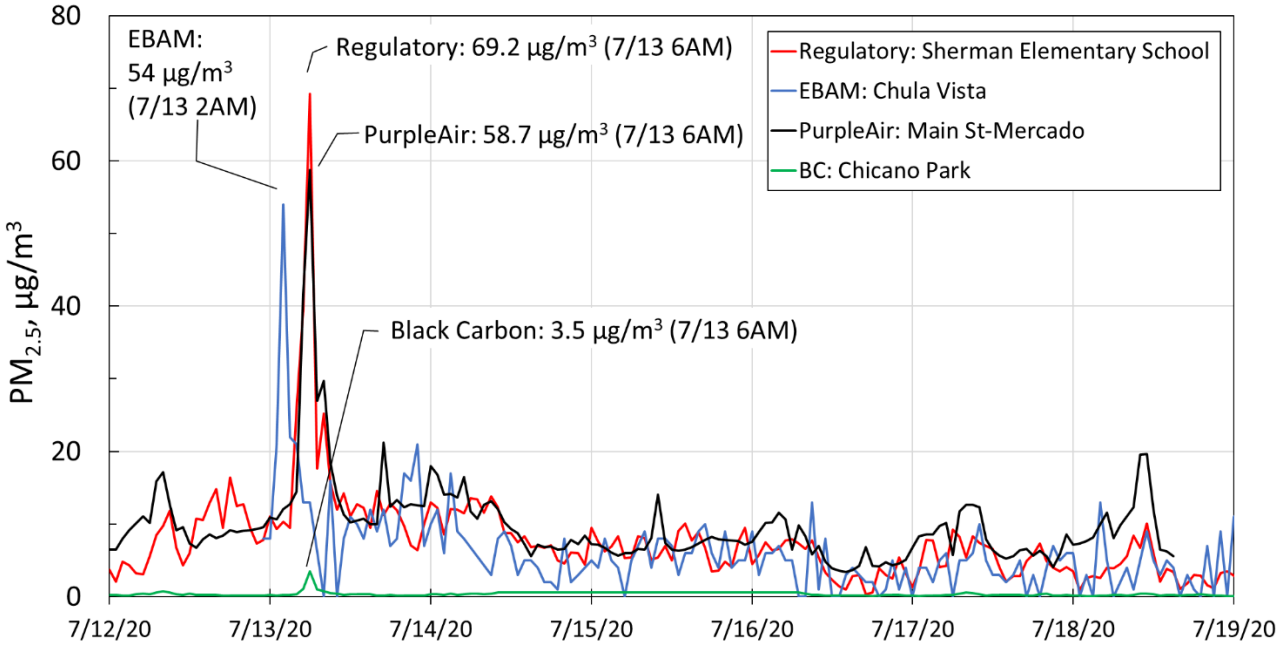
Figure 5-1. $PM_{2.5}$ and BC monitoring sites with the highest concentration measured during the USS Bonhomme Richard fire.



Regulatory, EBAM, and PurpleAir $PM_{2.5}$ as well as BC concentration peaks occurred on July 13, 2020 as shown in Figure 5-2. The EBAM $PM_{2.5}$ concentration was the highest at 2 AM on July 13, 2020 at the Chula Vista site while $PM_{2.5}$ measured by other monitors showed peaks at 6 AM on July 13, 2020. At the Chula Vista site, wind was from the southwest (235 degrees) at 2 AM on July 13, 2020, indicating that the Chula Vista site was impacted by the fire indirectly or by other unknown $PM_{2.5}$ sources because the Chula Vista site was located southeast of the fire (Figure 5-1). At 6 AM on

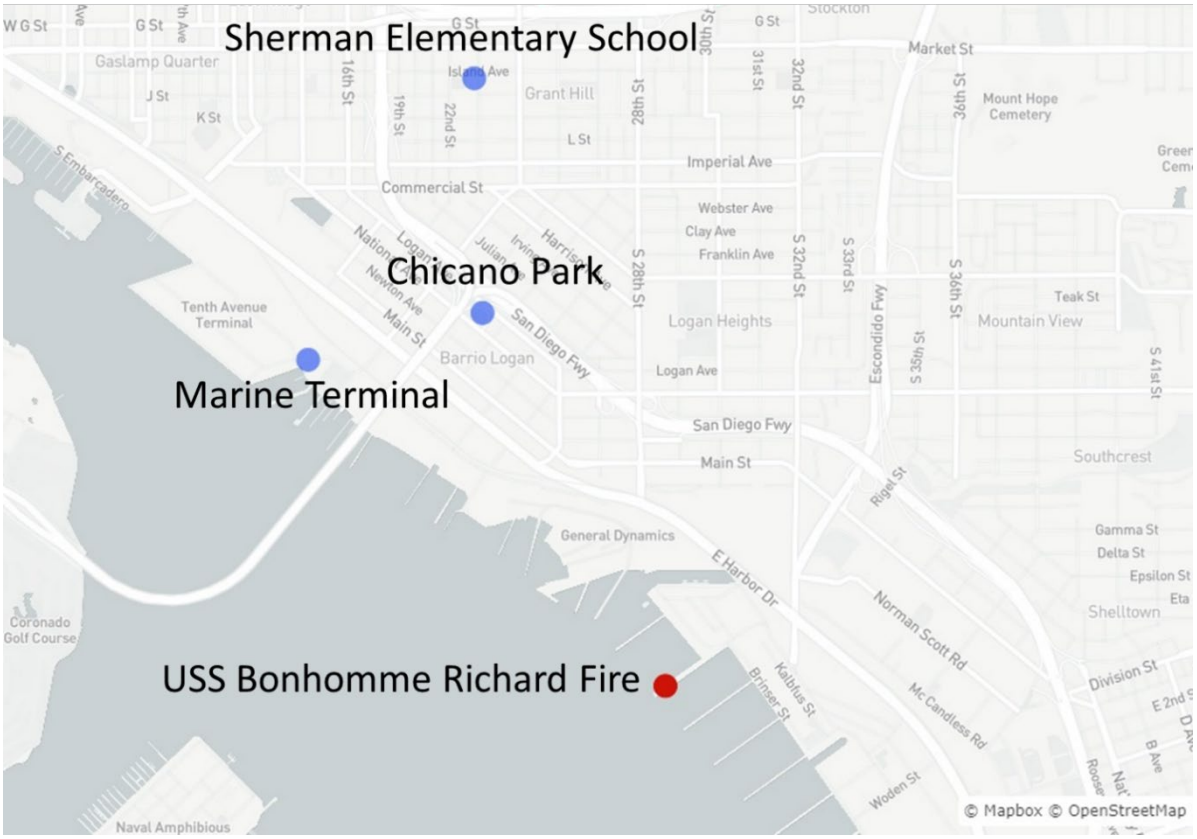
July 13, 2020, wind was from the south (184 degrees) at the Sherman Elementary School site indicating $PM_{2.5}$ impacts from the fire to the other three sites because they were located north of the fire.

Figure 5-2. The highest $PM_{2.5}$ and BC concentrations during the USS Bonhomme Richard fire.



6. Emergency Monitoring for PM_{10} Metals Data Analyses

Figure 6-1. PM_{10} metals monitoring sites (red dot indicates the USS Bonhomme Richard fire at Pier 2).



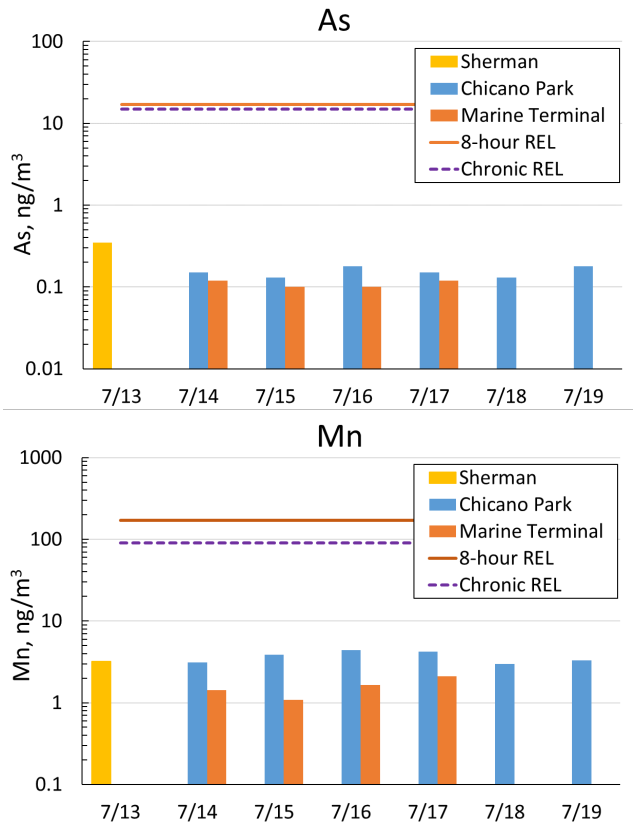
As part of the emergency air quality monitoring effort, SDAPCD collected filter samples and measured 24-hour average PM_{10} metal concentrations at three locations within two miles from the USS Bonhomme Richard fire: 10th Ave. Marine Terminal, Chicano Park, and Sherman Elementary School as shown in Figure 6-1. The measurement started on July 14, 2020 at both Marine Terminal and Chicano Park sites, and ended on July 17, 2020 at the Marine Terminal site and on July 19, 2020 at the Chicano Park site. At the Sherman Elementary School site, PM_{10} metal concentrations were only measured on July 13, 2020.

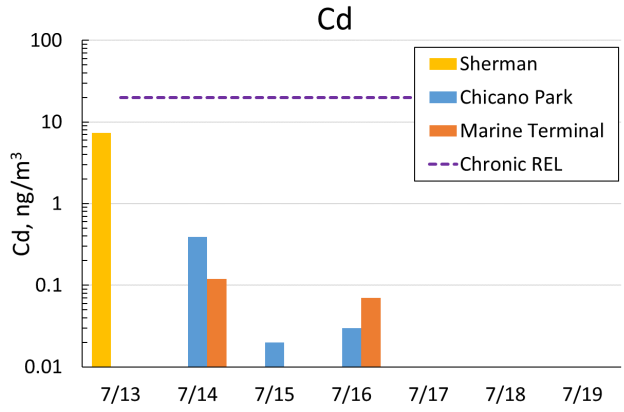
SDAPCD measured fifteen PM_{10} metals: Antimony (Sb), Arsenic (As), Barium (Ba), Beryllium (Be), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Lead (Pb), Manganese (Mn), Molybdenum (Mo), Nickel (Ni), Selenium (Se), Strontium (Sr), Tin (Sn), and Vanadium (V). Among them, Be and Cr concentrations were below the method detection limits (MDL).[11]

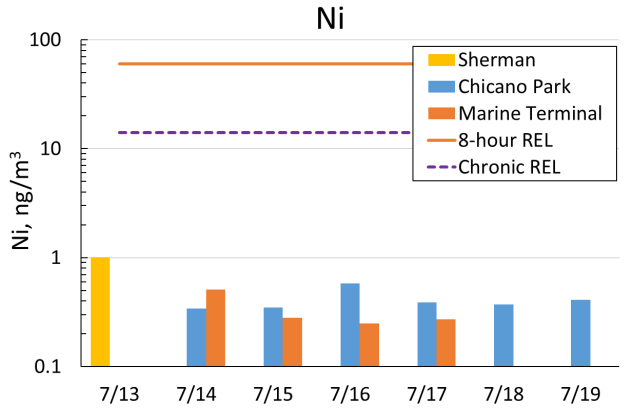
[11] The method detection limit is the minimum measured concentration of a substance that the measured concentration is distinguishable from method blank results with 99% confidence (https://www.epa.gov/sites/production/files/2016-12/documents/mdl-procedure_rev2_12-13-2016.pdf)

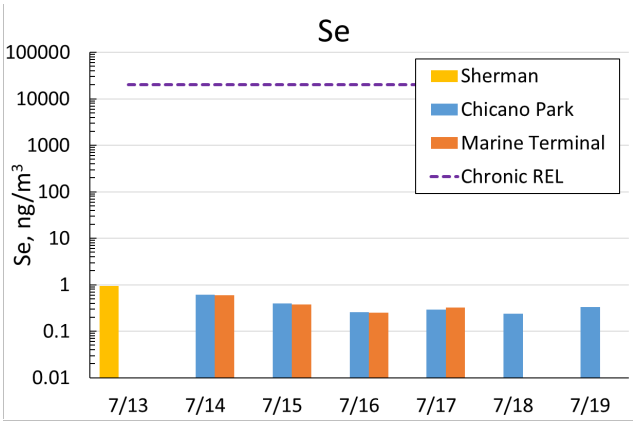
Figure 6-2 presents PM_{10} metal concentrations at three locations during the fire. Among thirteen PM_{10} metals, after excluding those two metals below the MDL, only the five PM_{10} metals that had RELs are shown in Figure 6-2. There are no 8-hour RELs for Cd and Se. None of these PM_{10} metal concentrations exceeded either the 8-hour or the chronic (continuous exposures for a year) RELs during the fire. Based on Figure 6-2, if these concentrations continued for an entire year, the chronic RELs would not be exceeded. The highest PM_{10} Pb concentration was 18 ng/m^3 at the Sherman Elementary School on July 13, 2020. RELs for Pb are not available. The USEPA 3-month rolling average NAAQS of Pb is 150 ng/m^3. Even if the highest Pb concentration during the fire, 18 ng/m^3, continued for 3 months, the USEPA NAAQS of 150 ng/m^3 would not be exceeded.

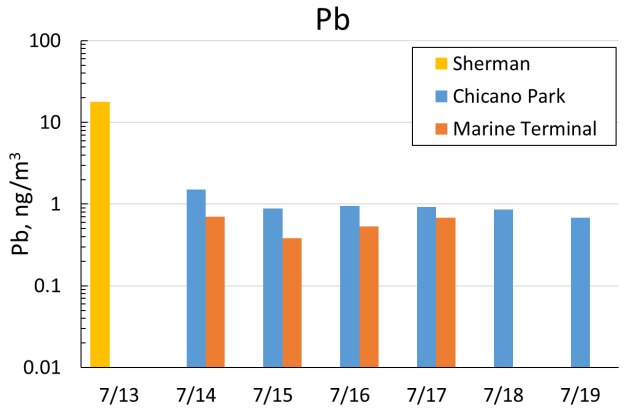
Figure 6-2. PM_{10} metal concentrations during the USS Bonhomme Richard fire at three monitoring sites (Y-axis: logarithmic scale).




Cd
Cd, ng/m3
100
10
1
0.1
0.01
7/13
7/14
7/15
7/16
7/17
7/18
7/19
Sherman
Chicano Park
Marine Terminal
Chronic REL

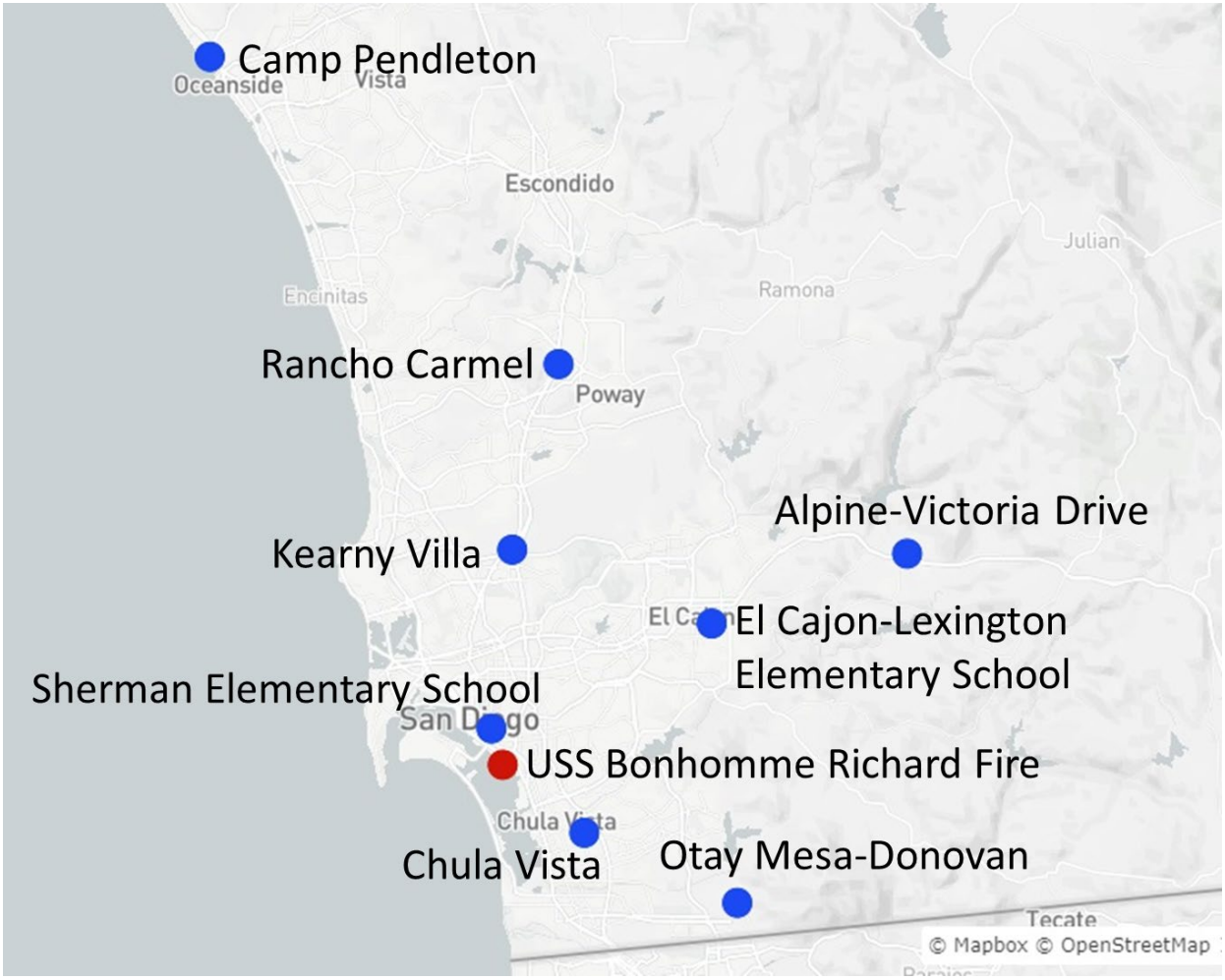

Ni
Ni, ng/m3
100
10
1
0.1
7/13
7/14
7/15
7/16
7/17
7/18
7/19
Sherman
Chicano Park
Marine Terminal
8-hour REL
Chronic REL


Se
Se, ng/m3
100000
10000
1000
100
10
1
0.1
0.01
7/13
7/14
7/15
7/16
7/17
7/18
7/19
Sherman
Chicano Park
Marine Terminal
Chronic REL


Pb
Pb, ng/m3
100
10
1
0.1
0.01
7/13
7/14
7/15
7/16
7/17
7/18
7/19
Sherman
Chicano Park
Marine Terminal

7. Regulatory Monitoring for NO_X Data Analyses

Figure 7-1. NO_X regulatory monitoring sites in San Diego County.



High NO_X concentrations can be an indication of increased industry or automobile activities. In San Diego County, hourly NO_X concentrations were measured at eight regulatory monitoring sites (Figure 7-1). As shown in Figure 7-2, NO_X concentrations collected at all eight sites were below the 1-hour NO_2 NAAQS (i.e., 100 ppb) during the USS Bonhomme Richard fire (indicated by the red shading). Because NO_X concentration includes both NO and NO_2, NO_2 concentrations collected by SDAPCD were below the 1-hour NO_2 NAAQS. Also, there was no significant increase in NO_X concentrations during the fire. NO_X concentrations at the Rancho Carmel site were higher than other sites because it is located near Interstate Highway 15 (< 0.02 miles).

Figure 7-2. Hourly NOx concentrations between June and July, 2020 at eight monitoring sites in San Diego County (red shading indicates the timing of the USS Bonhomme Richard fire).

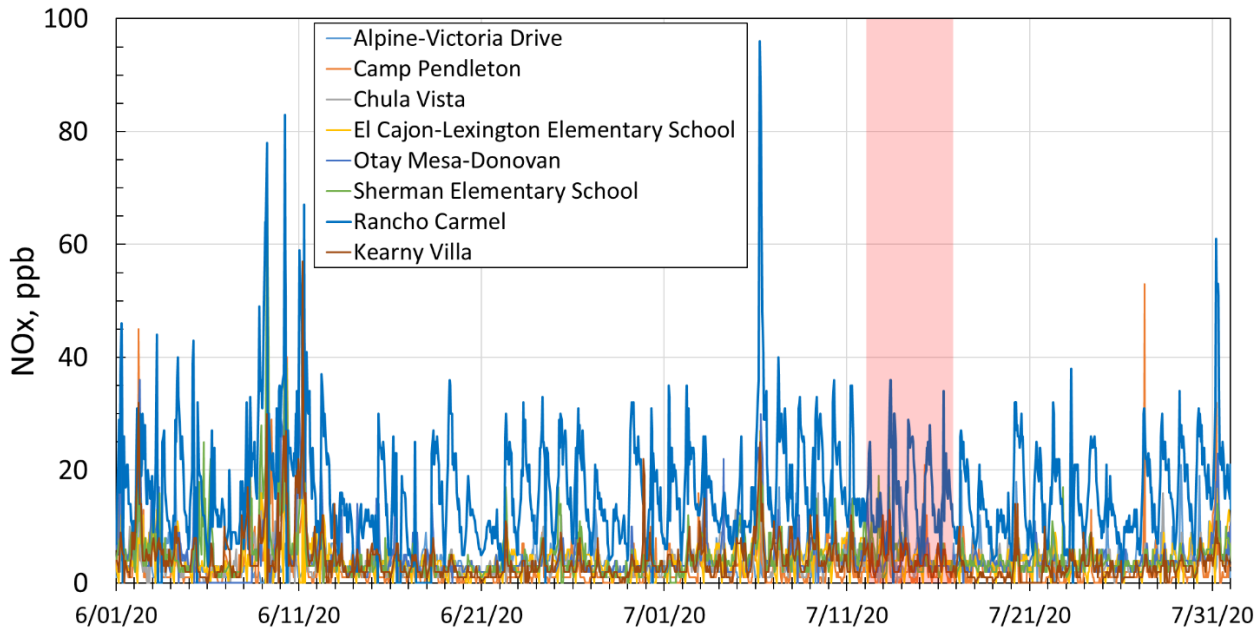
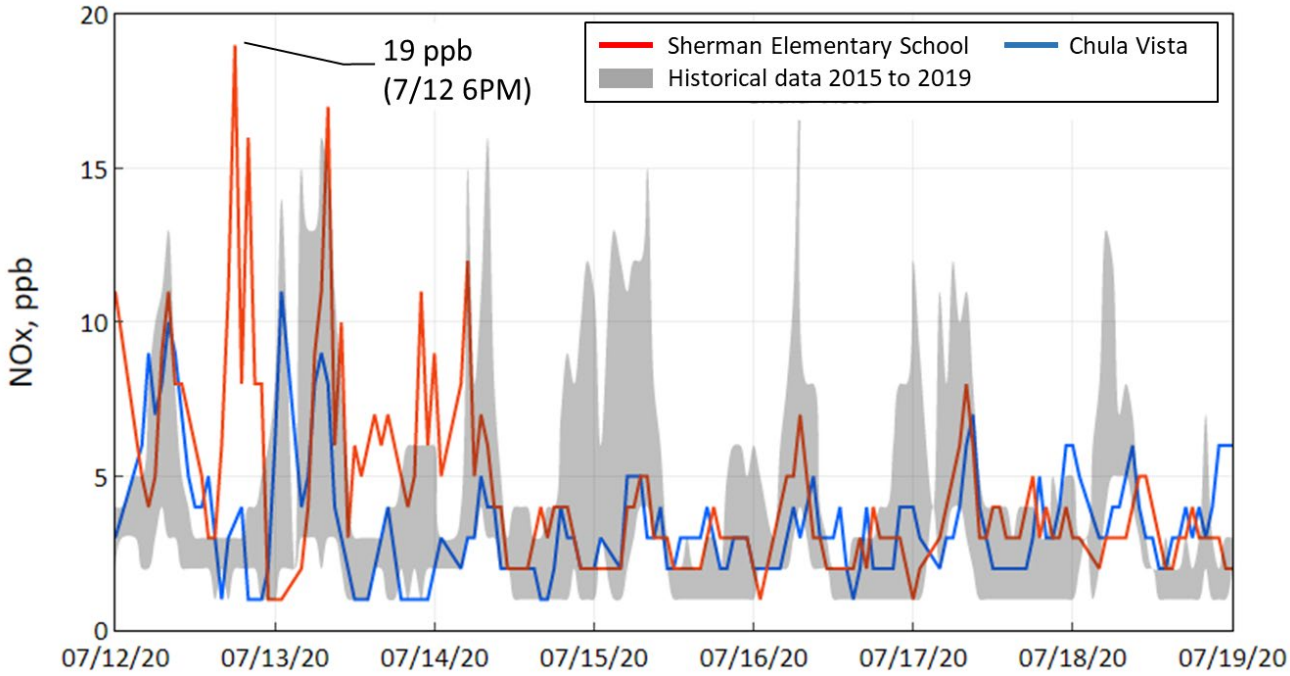


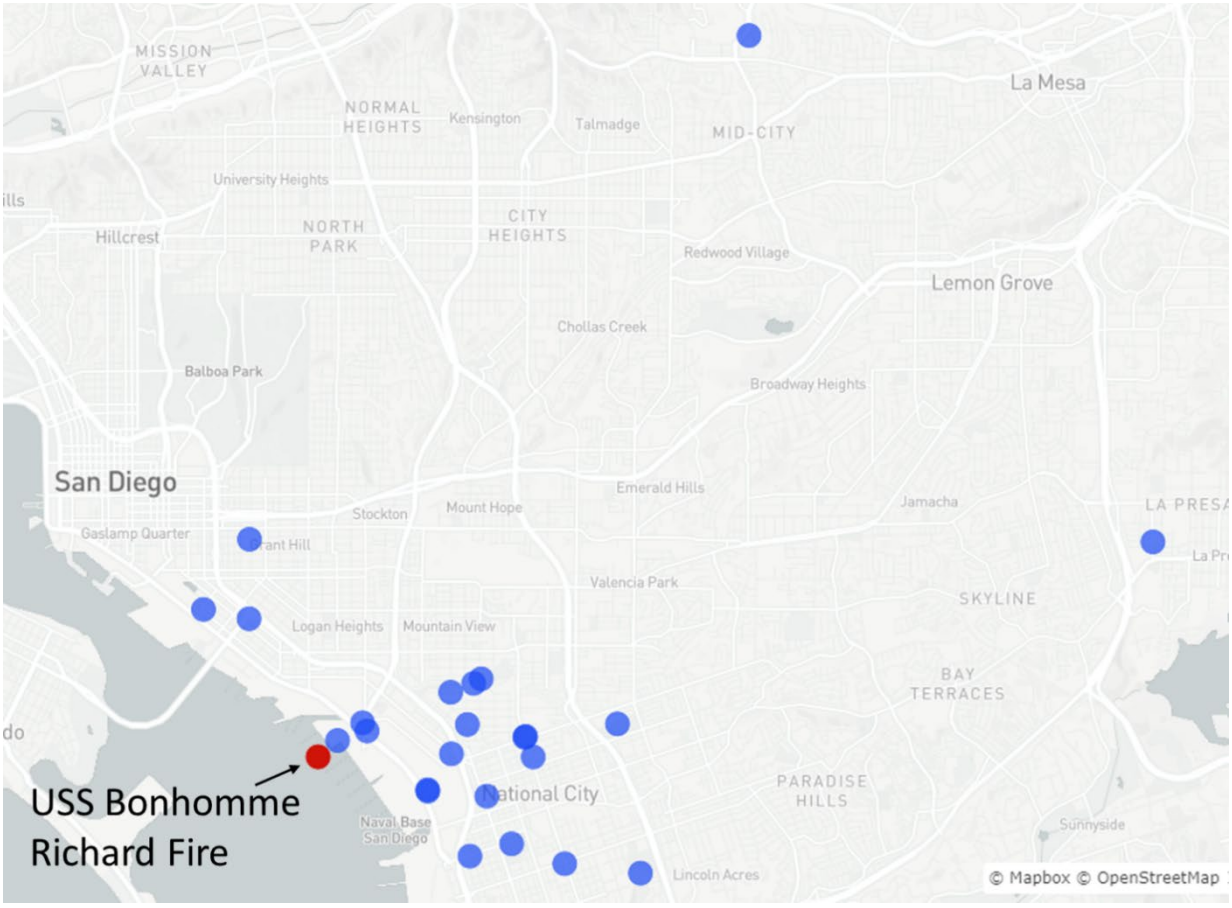
Figure 7-3 compares hourly NOx concentrations collected from the two monitoring sites closest to the fire: The Sherman Elementary site (2 miles from the fire) and the Chula Vista site (5.5 miles from the fire). During the fire, NOx concentrations were slightly elevated (19 parts per billion (ppb) at 6 PM and 16 ppb at 8 PM on July 12, 2020; 17 ppb at 8 AM on July 13, 2020) at the Sherman Elementary site. These elevated concentrations were associated with southerly wind. Therefore, it looks like increased heavy/light duty engine activities near the fire during the evening of July 12, 2020 and the morning of July 13, 2020 may have contributed to increased NOx concentrations. At the Chula Vista site, historical NOx data were available. After July 12, 2020, NOx concentrations during the fire were within or lower than the historical NOx range between 2015 and 2019 as shown in Figure 7-3.

Figure 7-3. Hourly NOx concentrations during the USS Bonhomme Richard fire at selected two monitoring sites (grey area indicates historical NOx concentrations at the Chula Vista site between 2015 and 2019).



8. Emergency Monitoring for VOC Data Analyses

Figure 8-1. VOC canister sampling locations.



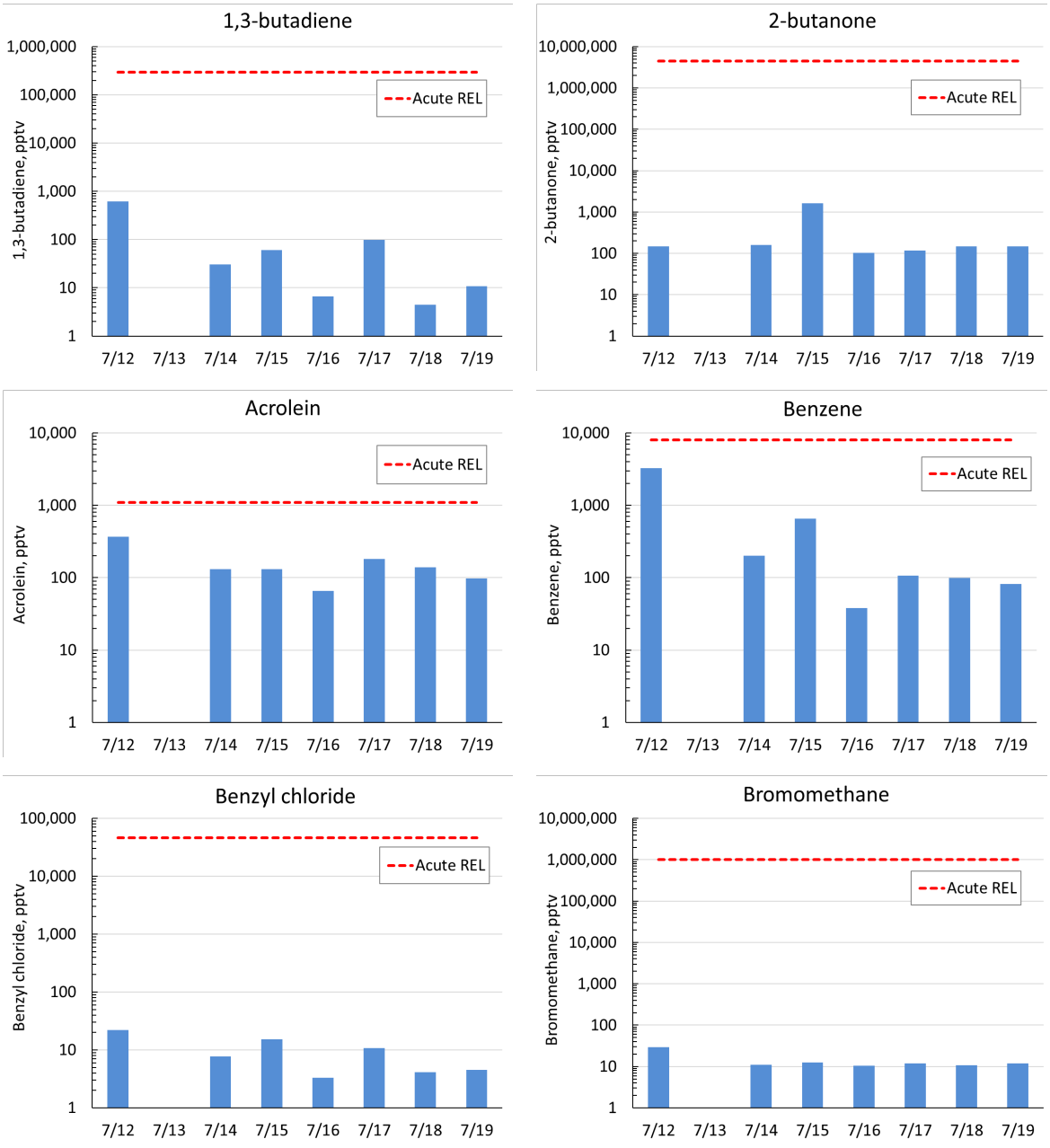
As part of the emergency air quality monitoring effort, SDAPCD collected 24 canister samples (eighteen 30-second grab samples and six 5-hour samples) at 22 locations near the USS Bonhomme Richard fire (Figure 8-1) between July 12 and 19, 2020 and analyzed 56 volatile organic compounds (VOCs).

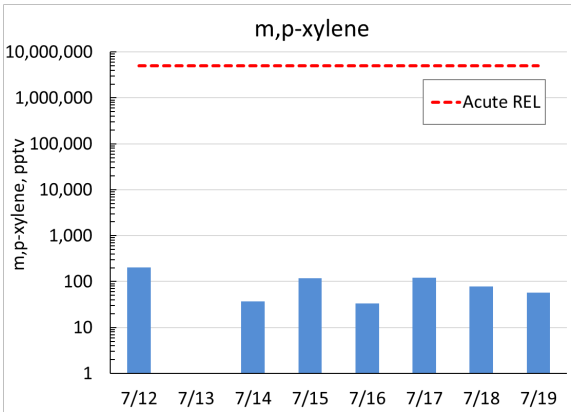
Of the 56 compounds analyzed, SDAPCD selected 32 compounds that showed elevated levels (i.e., higher than the median at two nearby routine monitoring sites, Donovan site (January 2018 - July 2020) and Sherman Elementary sites (October 2019 - July 2020)). Figure 8-2 shows the highest VOC concentrations for each day among 30-second grab samples during the fire (Y-axis: logarithmic scale). Only 11 compounds that had the acute RELs were shown in Figure 8-2. Even though the levels were elevated in the grab canister samples, none of these concentrations exceeded the acute RELs. For example, the highest benzene level of 3251

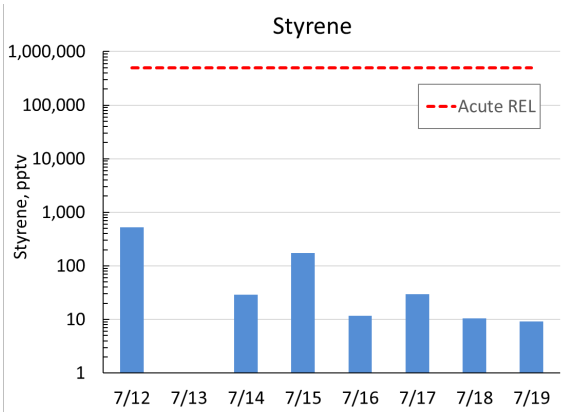
parts per trillion volume (pptv) was measured via grab sample approximately 7.3 miles away at the San Diego State University Parking Lot #2 (College Avenue and Zura Way) at 11:02 PM on July 12, 2020. This highest level of 3251 pptv did not exceed the acute benzene REL of 8000 pptv. The previously recorded highest concentration for benzene

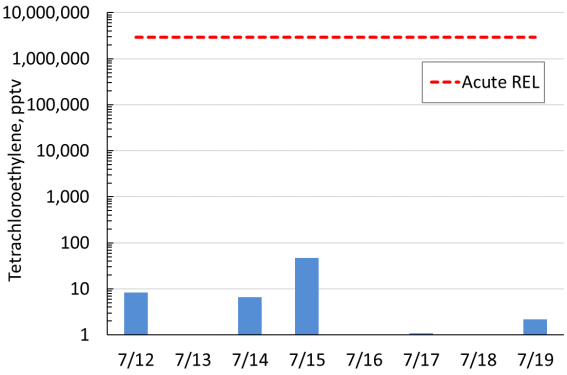
occurred in January 2018 with a 24-hour average level of 675 pptv at the Donovan site (2 miles from US/Mexico border). The median 24-hour average concentrations observed at the Donovan and Sherman Elementary routine monitoring sites since 2018 were 156 pptv and 271 pptv, respectively.

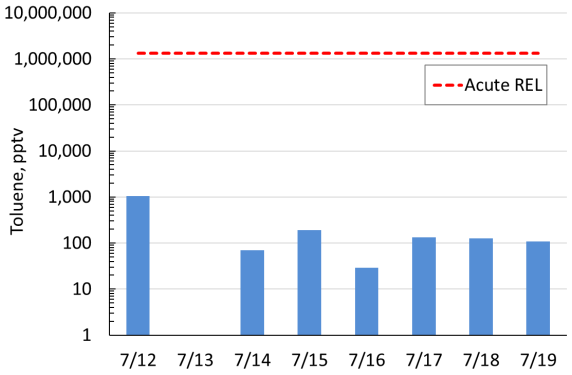
Figure 8-2. The highest VOC concentrations each day among 30-second grab canister samples during the USS Bonhomme Richard fire (Y-axis: logarithmic scale).

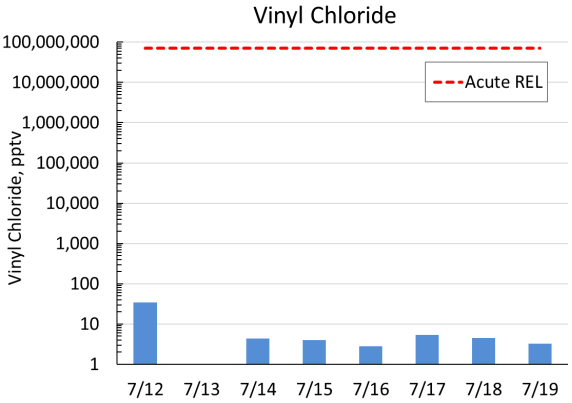



m,p-xylene
m,p-xylene, pptv
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Acute REL
7/12
7/13
7/14
7/15
7/16
7/17
7/18
7/19


Styrene
Styrene, pptv
1,000,000
100,000
10,000
1,000
100
10
1
Acute REL
7/12
7/13
7/14
7/15
7/16
7/17
7/18
7/19

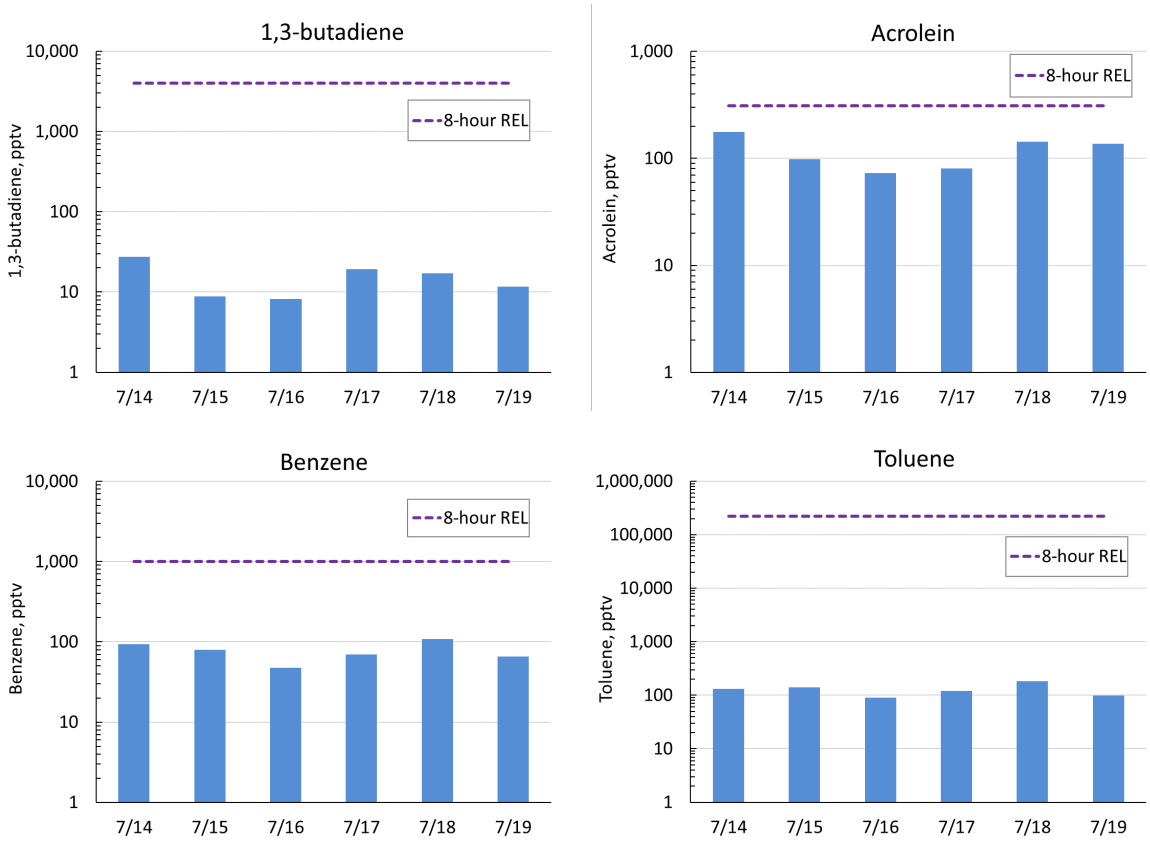

Tetrachloroethylene
Tetrachloroethylene, pptv
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Acute REL
7/12
7/13
7/14
7/15
7/16
7/17
7/18
7/19


Toluene
Toluene, pptv
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Acute REL
7/12
7/13
7/14
7/15
7/16
7/17
7/18
7/19


Vinyl Chloride
Vinyl Chloride, pptv
100,000,000
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
Acute REL
7/12
7/13
7/14
7/15
7/16
7/17
7/18
7/19

For the 5-hour canister samples, the closest RELs for comparison were the 8-hour RELs. Only 1,3-butadiene, acrolein, benzene, and toluene had 8-hour RELs and are shown in Figure 8-3 (please see the disclaimer). These four compounds did not exceed the 8-hour RELs.

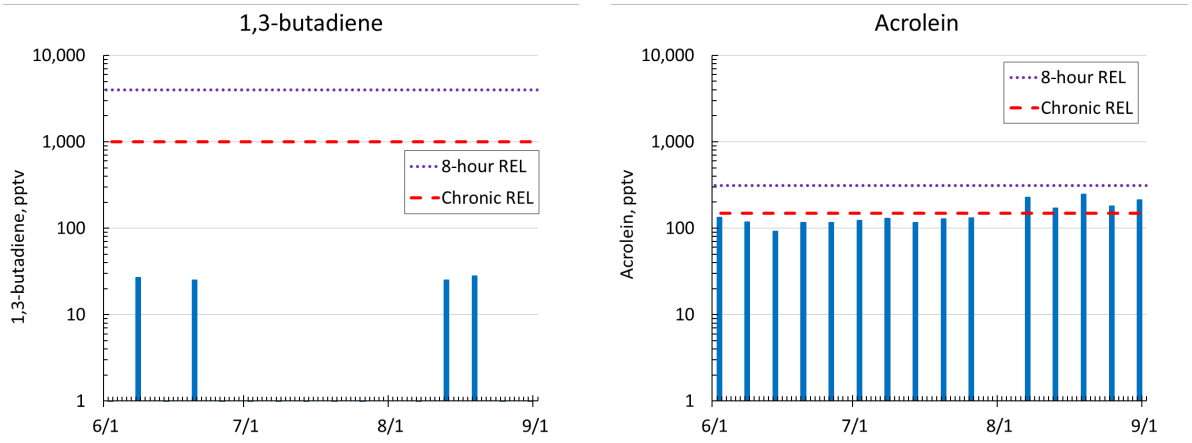
Figure 8-3. VOC concentrations of 5-hour canister samples during the USS Bonhomme Richard fire (Y-axis: logarithmic scale).

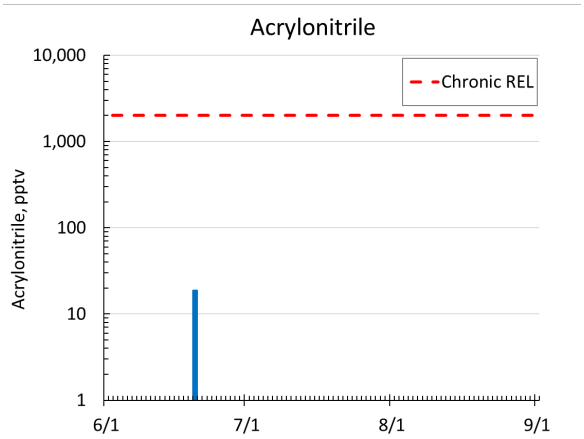


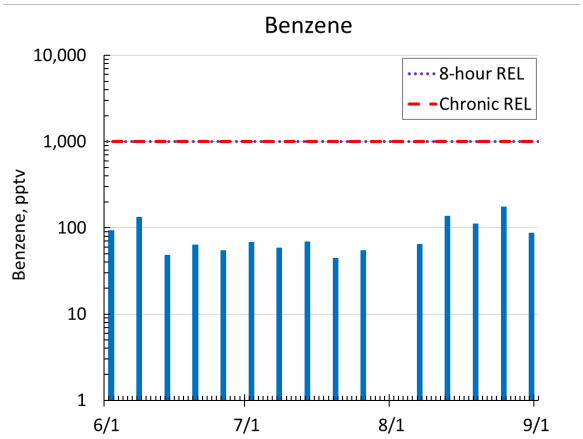
9. Routine Monitoring for VOC Data Analyses

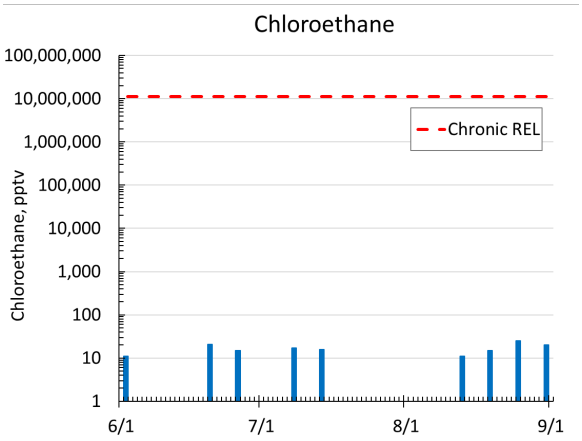
SDAPCD routinely collects canister samples and measures 24-hour average VOC concentrations every six days at the Sherman Elementary School site (Figure 1-1). SDAPCD reported 56 compounds per each canister sample from October 25, 2019 to December 29, 2020. Of the 32 elevated compounds selected by SDAPCD (i.e., compounds higher than the median at the Donovan and Sherman Elementary School routine monitoring sites), 15 compounds that had 8-hour RELs or chronic RELs from June 2, 2020 to August 31, 2020 were shown in Figure 9-1. RELs for the 24-hour average VOC concentrations do not exist (please see the disclaimer). Missing data in Figure 9-1 indicate that the compound concentrations were below the method detection limits (except for August 1, 2020 when no sample was collected). During the USS Bonhomme Richard fire, VOC concentrations were monitored on July 14, 2020 and none of the 15 compounds exceeded the 8-hour REL or chronic REL. While several acrolein concentrations were higher than 150 pptv in August 2020, the chronic REL of acrolein was not exceeded because these elevated concentrations did not last for an entire year. Acrolein is formed from cooking or combustion of biomass and petroleum. The cause of the elevated acrolein concentrations in August 2020 at the Sherman Elementary School site requires further investigation.

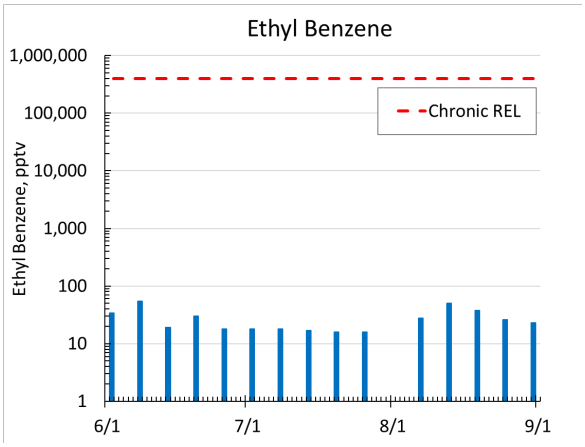
Figure 9-1. The 24-hour average VOC concentrations between June 2020 and August 2020 at the Sherman Elementary School site (Y-axis: logarithmic scale).

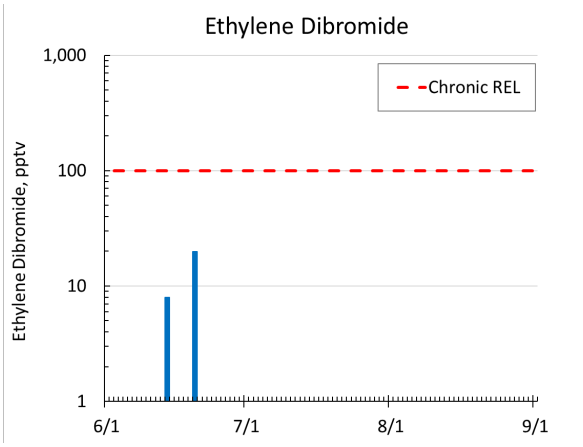


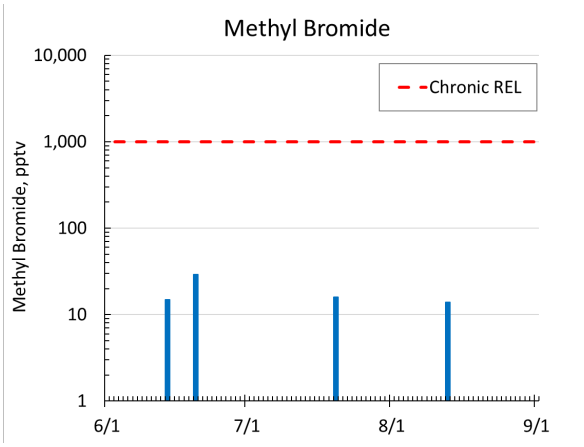

Acrylonitrile
Chronic REL
Acrylonitrile, pptv
10,000
1,000
100
10
1
6/1
7/1
8/1
9/1

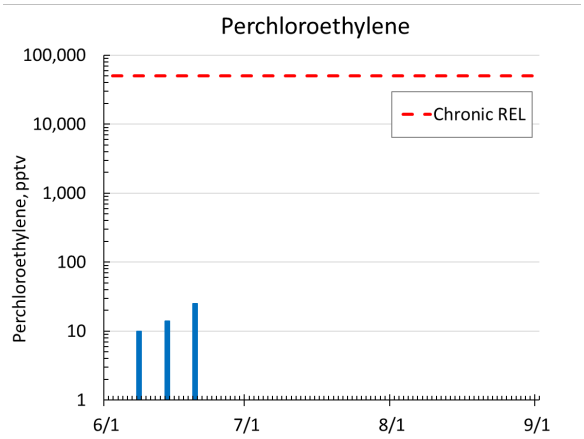

Benzene
8-hour REL
Chronic REL
Benzene, pptv
10,000
1,000
100
10
1
6/1
7/1
8/1
9/1

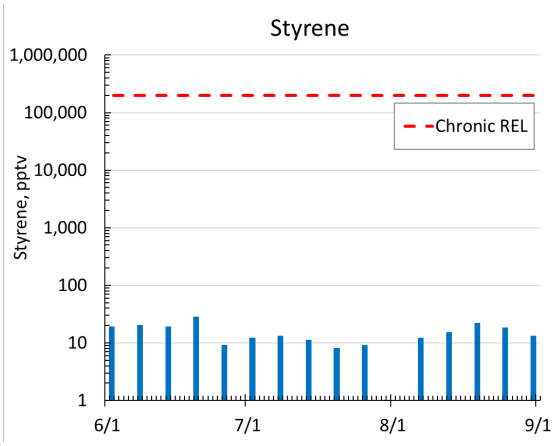

Chloroethane
Chronic REL
Chloroethane, pptv
100,000,000
10,000,000
1,000,000
100,000
10,000
1,000
100
10
1
6/1
7/1
8/1
9/1

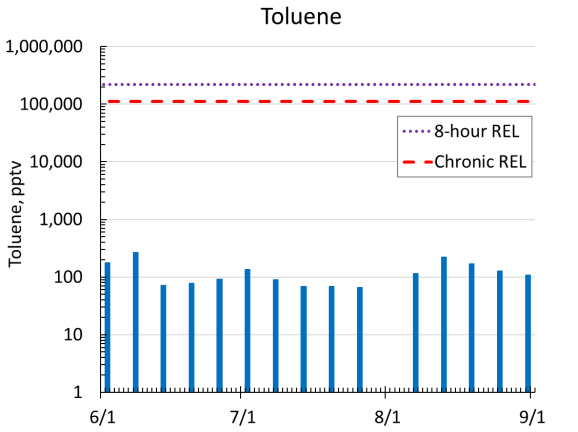

Ethyl Benzene
Chronic REL
Ethyl Benzene, pptv
1,000,000
100,000
10,000
1,000
100
10
1
6/1
7/1
8/1
9/1

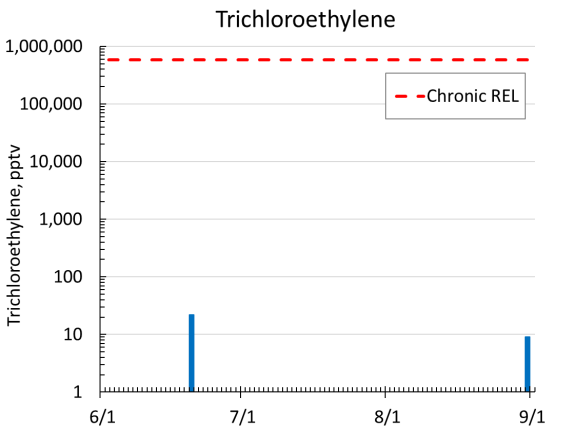

Ethylene Dibromide
Chronic REL
Ethylene Dibromide, pptv
1,000
100
10
1
6/1
7/1
8/1
9/1

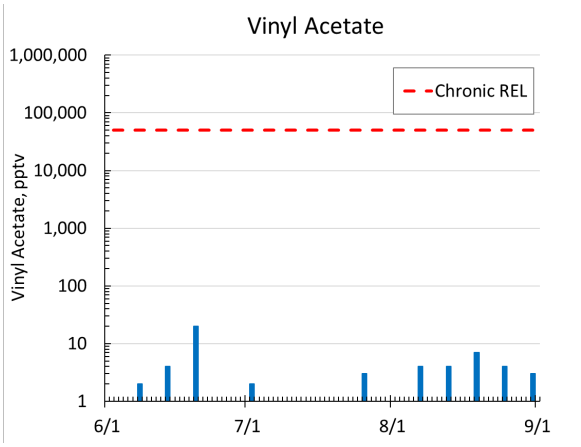

Methyl Bromide
Chronic REL
Methyl Bromide, pptv
10,000
1,000
100
10
1
6/1
7/1
8/1
9/1

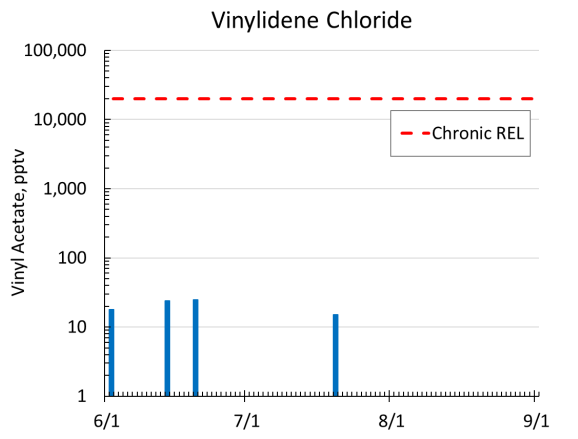

Perchloroethylene
100,000
10,000
1,000
100
10
1
Perchloroethylene, pptv
Chronic REL
6/1
7/1
8/1
9/1

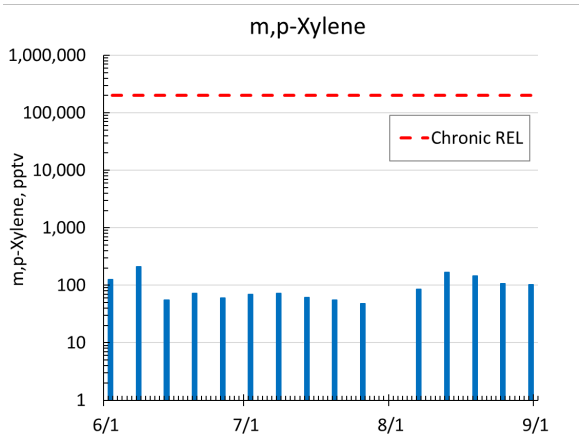

Styrene
1,000,000
100,000
10,000
1,000
100
10
1
Styrene, pptv
Chronic REL
6/1
7/1
8/1
9/1


Toluene
1,000,000
100,000
10,000
1,000
100
10
1
Toluene, pptv
8-hour REL
Chronic REL
6/1
7/1
8/1
9/1


Trichloroethylene
1,000,000
100,000
10,000
1,000
100
10
1
Trichloroethylene, pptv
Chronic REL
6/1
7/1
8/1
9/1

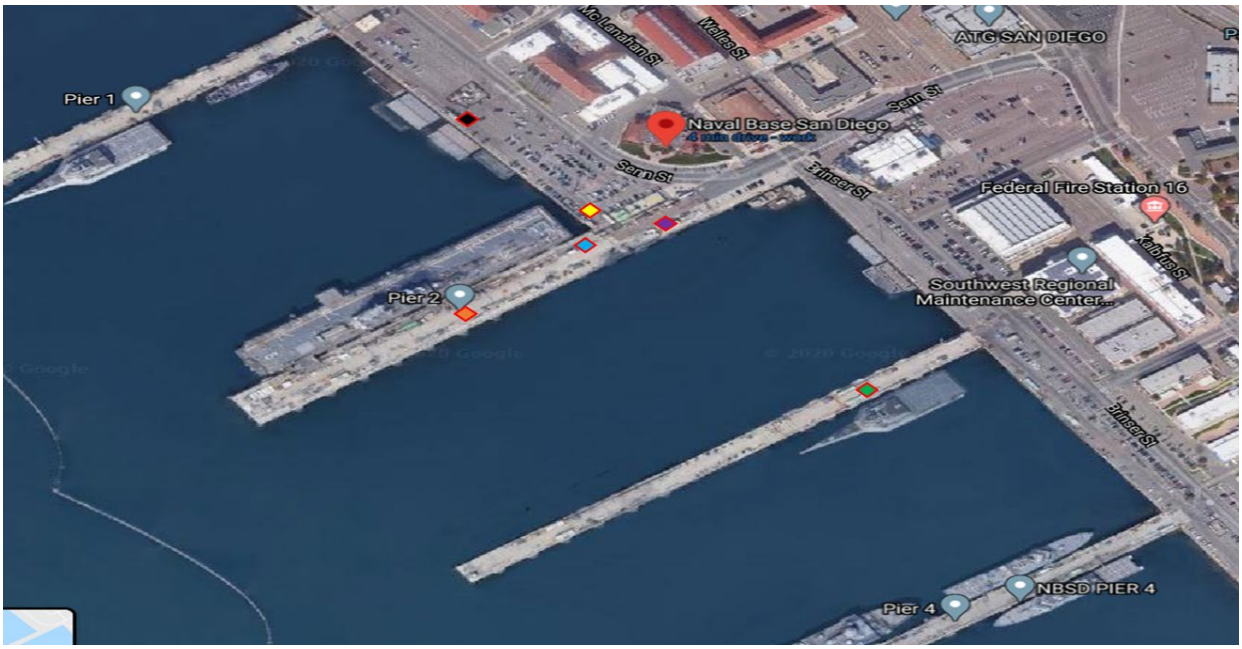

Vinyl Acetate
1,000,000
100,000
10,000
1,000
100
10
1
Vinyl Acetate, pptv
Chronic REL
6/1
7/1
8/1
9/1


Vinylidene Chloride
100,000
10,000
1,000
100
10
1
Vinyl Acetate, pptv
Chronic REL
6/1
7/1
8/1
9/1


m,p-Xylene
1,000,000
100,000
10,000
1,000
100
10
1
m,p-Xylene, pptv
Chronic REL
6/1
7/1
8/1
9/1

10. Navy Atmospheric Readings Analyses

Figure 10-1. Locations of the Navy air monitoring sites.[12]



LEGEND [12]
Peak readings were taken in front of the USS Stockdale quarter deck on pier 3
Peak readings were taken on pier 2 approximately 15 yards away from the port side stern gate of the USS BHR
Peak readings were taken AFT of the stern gate of the USS BHR, approximately 30 yards away, in the parking lot north of pier 2
Peak readings were taken at the Incident Command Post on pier 2
Peak readings were taken on pier 2 adjacent to port side hangar bay
Peak reading were taken by living barge APL-65 between piers 1 & 2

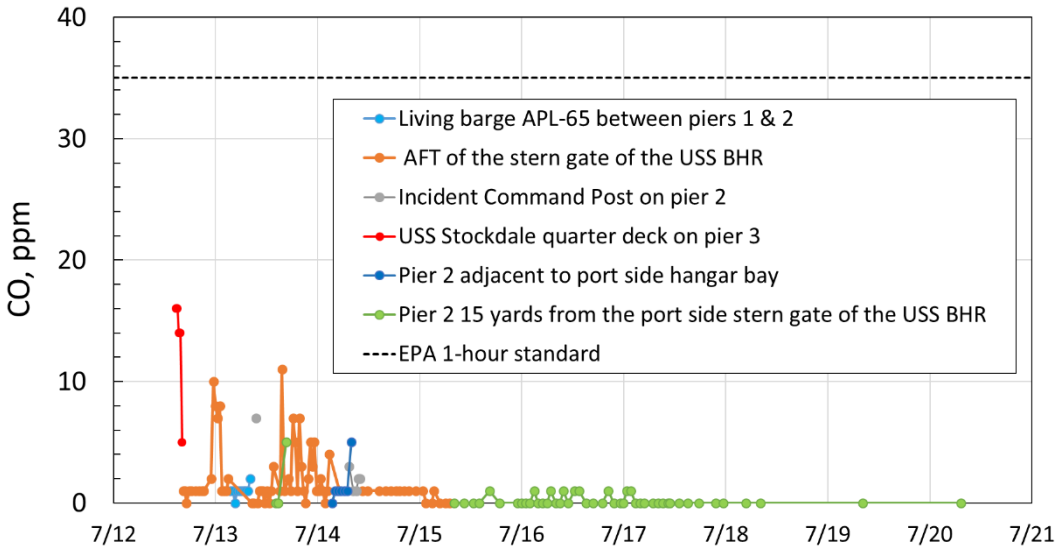
For the workers' air pollution exposure safety, air monitoring was conducted by the Navy on the piers near the USS Bonhomme Richard fire. O_2, CO, H_2S, and VOC were randomly measured at time intervals from 14 min to 24 hours at six spots within 0.2 miles from the fire between July 12 and 20, 2020 (Figure 10-1).

O_2 concentration was constantly 20.8 % which was within the normal range of O_2 levels (19.5% - 22.0%) according to the Occupational Safety and Health Administration (OSHA). The highest H_2S concentration was 1 part per million (ppm). Although California's 1-hour ambient air quality standard for H_2S is 0.03 ppm, OSHA's permissible exposure limit (PEL) for General Industry H_2S Ceiling Limit is 20 ppm and the Shipyard 8-hour H_2S limit is 10 ppm.

[12] provided by the Navy Region Southwest N-40 Fleet

Figure 10-2 shows that CO concentration was the highest (16 ppm) at 3 PM on July 12, 2020 at the USS Stockdale quarter deck on Pier 3 and decreased to 1 ppm in the morning on July 14, 2020. The highest CO concentration of 16 ppm was below the 1-hour CO NAAQS (i.e., 35 ppm).

Figure 10-2. CO concentrations during the USS Bonhomme Richard fire.



As shown in Figure 10-3, the highest VOC concentration was 4.2 ppm at 3 PM on July 12, 2020 at the USS Stockdale quarter deck on Pier 3. A VOC health standard has not been set. In Table 2, the observation of smoke from the fire is summarized. During the fire, smoke traveled mostly northeast, east, and southeast (about 81% of observations). This coincides with results from the pollution rose and forward-trajectory analyses as shown in Figures 11-1, 11-2, and 11-3.

Figure 10-3. VOC concentrations during the USS Bonhomme Richard fire.

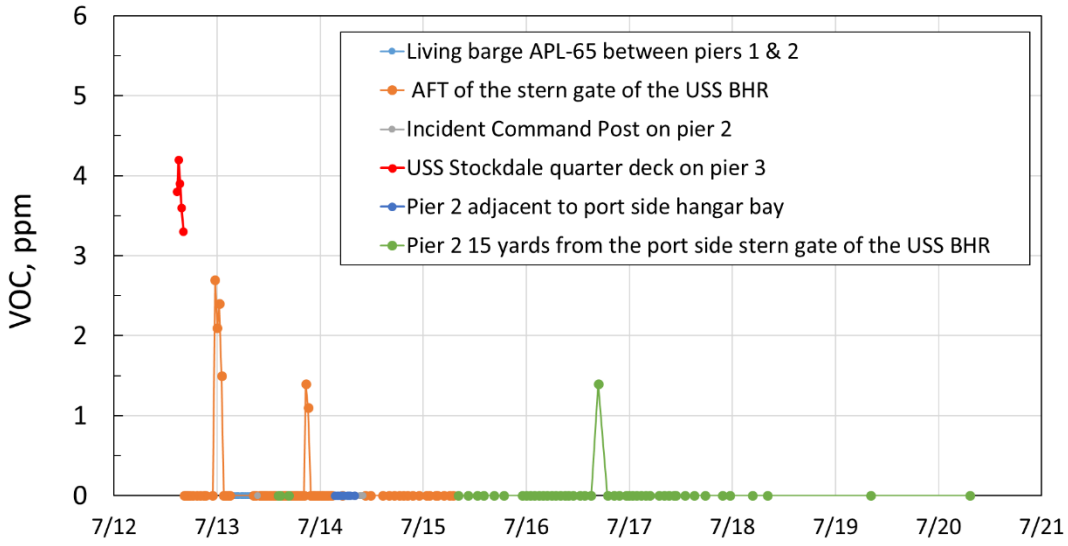


Table 2. Summary of the USS Bonhomme Richard fire smoke observations.

Date & Time	Direction of smoke travel
07/12/20 14:40	Smoke traveling south to southeast
07/13/20 00:00	Smoke is traveling mainly vertical and northeast
07/13/20 07:35	Smoke is hovering around pier 2 and traveling east
07/13/20 08:05	Smoke is traveling vertical and east
07/13/20 08:30	Smoke is traveling mainly vertical and southeast
07/13/20 09:01	Smoke is traveling mainly east with a slight draw southeast
07/13/20 09:55	Smoke is hovering around pier 2 and traveling northeast
07/13/20 10:20	Smoke is traveling mainly vertical and east with a slight draw northeast
07/13/20 10:42	Smoke is traveling mainly vertical and east to northeast
07/13/20 11:33	Smoke is traveling mainly east to northeast
07/13/20 14:12	Smoke is traveling east with a slight draw southeast
07/13/20 15:08	Smoke is traveling east
07/13/20 16:10	Smoke is traveling east with a slight draw southeast
07/13/20 16:40	Smoke is traveling southeast
07/13/20 17:10	Smoke is traveling east with a slight draw northeast
07/13/20 17:39	Smoke is traveling east
07/13/20 20:40	Smoke is traveling southeast
07/13/20 21:11	Smoke is traveling east
07/13/20 22:45	Smoke is traveling slightly northeast
07/13/20 23:14	Smoke is traveling east
07/13/20 23:44	Smoke is traveling east with a slight draw northeast
07/14/20 00:14	Smoke is traveling east and mostly vertical
07/14/20 08:20	Smoke is traveling east and mostly vertical with a slight draw northeast
07/14/20 09:34	Smoke is traveling east and mostly vertical
07/14/20 14:30	Smoke is traveling east and mostly vertical with a slight draw southeast
07/15/20 06:05	Minimal smoke traveling vertical and east
07/16/20 16:45	No visible smoke
07/16/20 23:55	Visible smoke forward of frame 33 port side, smoke moving south
07/17/20 03:47	No visible smoke

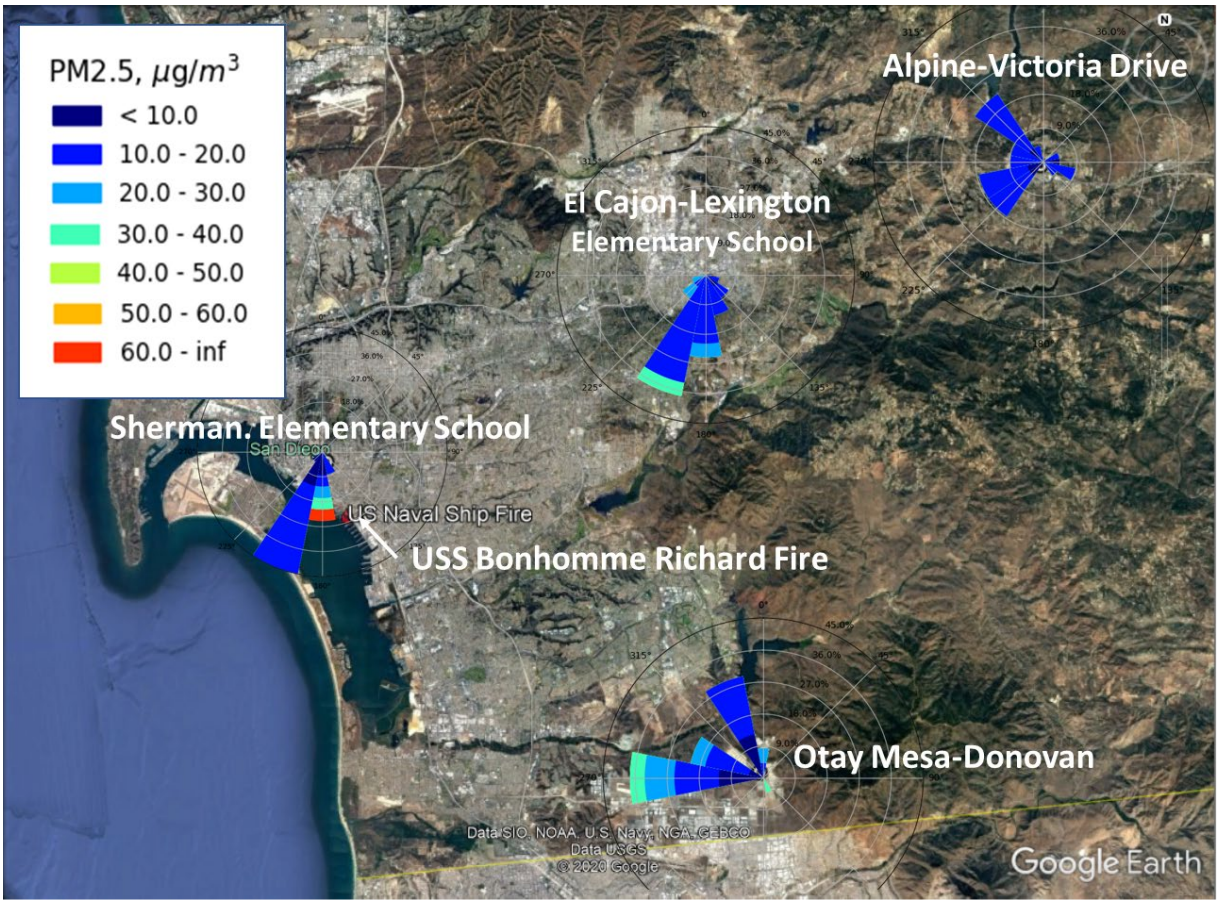
11. Pollution Rose and Trajectory Analyses

Pollutant levels at the surface are highly dependent on the emission source characterization and the meteorology. In terms of the emission source characterization, what is burning, how much, and how intensely all affect how the smoke interacts, chemically and physically, with the nearby air, how much smoke is produced, and how the smoke plume behaves. With an intense fire, the temperature of the smoke is very high, so the smoke is very buoyant, has a lot of momentum and rises quickly. Winds also play an important role in smoke behavior. In conditions with strong winds, smoke travels more horizontally at the surface, and therefore has more near-source impacts. Under conditions with lighter winds the smoke plume is lofted higher up and travels downwind, so the impacts directly near the source are less.

In the case of the fire onboard the USS Bonhomme Richard, the fire was very intense and lighter winds (average wind speed of 4 miles per hour) were observed during the event. The smoke quickly rose high above the surface before being transported to the east. This resulted in slightly elevated concentrations across a larger region, in addition to lower than expected concentrations at monitors near the incident.

To investigate smoke behavior during the USS Bonhomme Richard fire, $PM_{2.5}$ pollution roses and trajectories were analyzed. A pollution rose is a variant of the wind rose that is useful for considering pollutant concentrations by wind direction, or more specifically the percentage of time that the concentration is in a particular wind direction range. Figure 11-1 shows the pollution rose plots at four $PM_{2.5}$ monitoring sites near the fire for July 13, 2020. At the Sherman Elementary School site, the pollution rose plot is showing higher $PM_{2.5}$ concentrations from the south. The location of the fire was south of this site. This indicates that the higher $PM_{2.5}$ concentrations at this site was likely due to the fire. Similarly, El Cajon Elementary School site shows higher concentrations from the southwest, which also corresponds to the location of the fire. The fire likely had less impact at this site due to distance.

Figure 11-1. $PM_{2.5}$ Pollution Rose plots at four monitoring sites in San Diego on July 13, 2020.



To support the pollution roses, 24-hour forward-trajectory analyses were conducted to track the fire plume from the fire site. At the fire site, 24-hour forward-trajectory analyses were conducted to track the air parcel that travelled from the site over 24 hours. The Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model was used to develop forward-trajectories of the air parcel at 100 meters (m) and 500 m heights as shown in Figures 11-2 and 11-3. Trajectories at the 500 m height were chosen to illustrate relatively stable atmospheric conditions and trajectories at 100 m height were chosen for the relatively lower atmosphere. Trajectories at heights lower than 100 m were not developed because the air parcel hitting the terrain caused deposition or removal of air pollutants. To account for meteorology, North American Mesoscale Forecast System 12 km forecast surface and upper air meteorological data produced by National Oceanic and Atmospheric Administration (NOAA) were used in the HYSPLIT model. Forward 24-hour trajectories for each hour of July 13, 2020 at 100 m and 500 m height are shown in Figures 11-2 and 11-3, respectively. On July 13, 2020, the air parcels carrying smoke from the fire traveled between north and east from the site at both heights and passed over $PM_{2.5}$ monitoring sites. The Sherman Elementary School site, the El Cajon-Lexington Elementary School site, and the

Alpine-Victoria Drive site showed higher $PM_{2.5}$ concentrations on that day and these trajectories affirm the contribution from the fire.

Figure 11-2. 24-hour forward-trajectories from the USS Bonhomme Richard fire location at 100 m height on July 13, 2020

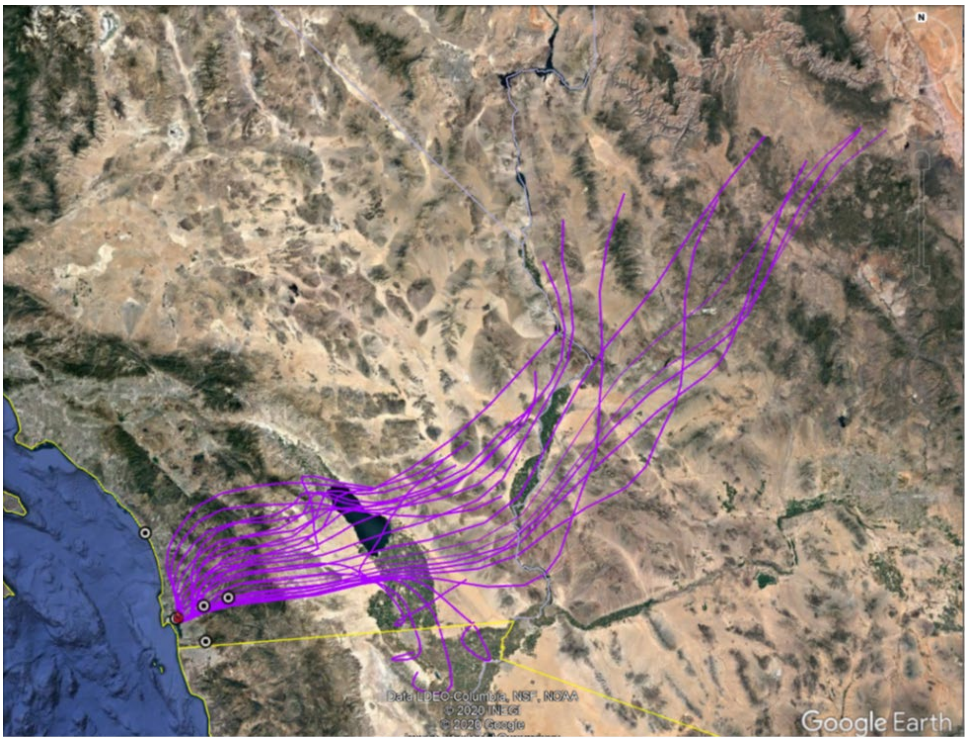
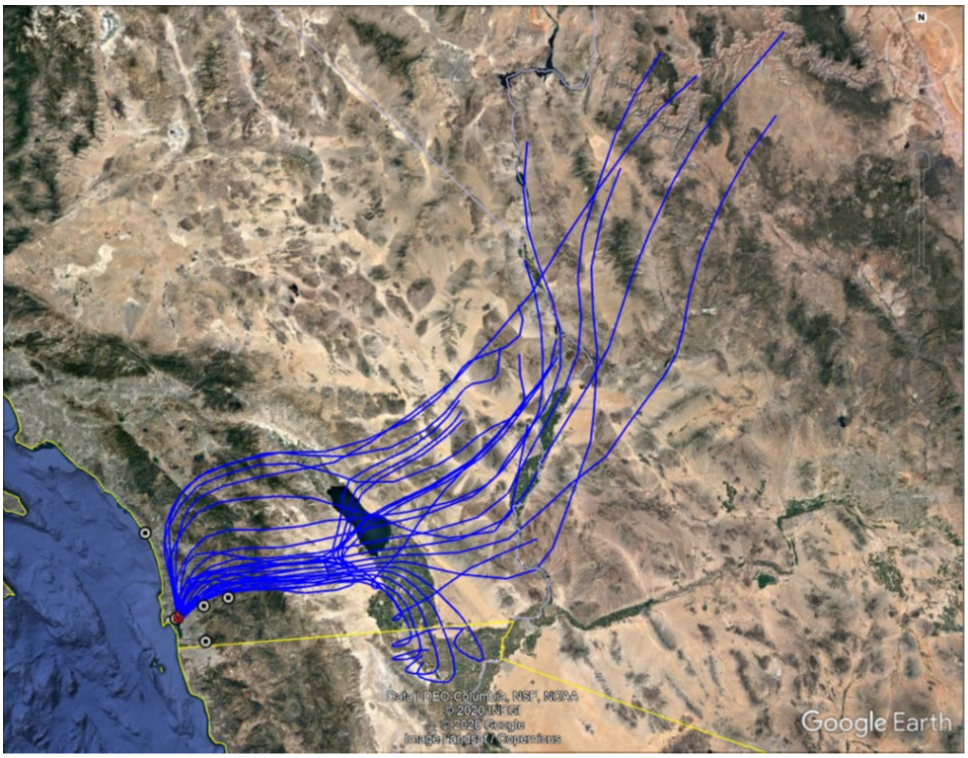


Figure 11-3. 24-hour forward-trajectories from the USS Bonhomme Richard fire location at 500 m height on July 13, 2020



12. Chemical Compounds in Smoke from Burning Plastics

In the mail from the Environmental Health Coalition requesting CARB to evaluate the SDAPCD monitoring data during the USS Bonhomme Richard fire, a burnt plastic smell was reported:

"The good news is that it's been dropping but the burnt plastic smell is really bad."

While pollutants released during wildfires are studied and known,[13] toxic pollutant emissions from structural fires, especially navy ship fires are less well known. Part of the smoke from the USS Bonhomme Richard fire could be from burning plastics. The open burning of plastic material and its emissions are of growing concern in areas where structure fires as well as wildland fires occur. Burning of polymeric materials that are the majority of plastic components releases organic carbon such as polycyclic aromatic hydrocarbons in the air. It includes toxic gases like dioxins, furans, mercury, and polychlorinated biphenyls.[14] Burning of poly vinyl chloride releases hazardous halogens that affect climate change. Also, high concentrations of sodium (Na), calcium (Ca), magnesium (Mg), silicon (Si), and aluminum (Al) were found in particulate soot and residue solid ash that could be from open combustion of plastics.[15] However, the pertinent monitoring data were not available to support any analytical conclusions of most of these chemicals emitted during the USS Bonhomme Richard fire.

[13] https://ww2.arb.ca.gov/sites/default/files/2021-07/Camp_Fire_report_July2021.pdf

[14] Simoneit, B., Medeiros, P., Didyk, B. Combustion products of plastics as indicators for refuse burning in the atmosphere. 2005. Environ Sci Technol. 39(18). pp6961-70.
Tomsej. T., Horak, J., Tomsejova, S., Krpec, K., Klanova, J., Dej, M., Hopan, F. 2018. The impact of co-combustion of polyethylene plastics and wood in a small residential boiler on emissions of gaseous pollutants, particulate matter, PAHs and 1,3,5- triphenylbenzene. Chemosphere. 196. pp18-24.
Valavanidis, A., Iliopoulos, N., Gotsis, G.,Fiotakis, K. 2008. Persistent free radicals, heavy metals and PAHs generated in particulate soot emissions and residue ash from controlled combustion of common types of plastic. J. Hazard. Mater. 56(1-3). pp277-84.

[15] Verma, R., Vinoda, K., Papireddy, M., Gowda, A. 2016. Toxic Pollutants from Plastic Waste- A Review. Procedia Environmental Sciences. 35. pp701-8

Summary and Conclusions

In this Appendix, ten air monitoring datasets, including USEPA, SDAPCD, Portside community, and the Navy data, along with air parcel trajectories were analyzed. The air monitoring data indicated that the USS Bonhomme Richard fire impacted the air quality of the nearby communities in San Diego County.

Regulatory $PM_{2.5}$ concentrations were elevated on July 12 and 13, 2020 during the fire. The highest 1-hour $PM_{2.5}$ concentration was 69.2 µg/m^3 at 6 AM on July 13, 2020 at the Sherman Elementary School site. The highest 24-hour average $PM_{2.5}$ concentration was 16.9 µg/m^3 on July 13, 2020 at the El Cajon-Lexington Elementary School site and it was below the 24-hour NAAQS of 35 µg/m^3. Although the USEPA 24-hour NAAQS for $PM_{2.5}$ was not exceeded, there is not enough information to conclude there were no adverse health effects from $PM_{2.5}$.

Black Carbon monitored under the AB 617 community monitoring program have shown higher concentrations on July 12 and 13, 2020. Unusual spikes in BC concentrations were observed on July 12 and 13, 2020 at all five sites, with peaks occurring on July 13, 2020. The monitored levels of black carbon do not appear to be at a level that would pose an immediate threat of health hazards given the amount of time that the exposure occurred.

PurpleAir monitoring data collected by the Portside community at Main St.-Mercado site have shown a spike in $PM_{2.5}$ concentrations of up to 58.7 µg/m^3 on July 13, 2020. This spike was likely due to the fire.

Hourly EBAM $PM_{2.5}$ and PM_{10} concentrations were elevated on July 13 and 14, 2020 at both the Chula Vista and Oceanview sites. The highest EBAM $PM_{2.5}$ and PM_{10} concentrations were 54 µg/m^3 and 119 µg/m^3, respectively, at 2 AM on July 13, 2020 at Chula Vista. At the Chula Vista site, EBAM $PM_{2.5}$ and PM_{10} concentrations on July 13 and 14, 2020 were higher than the historical data collected between 2015 and 2019.

Twenty four-hour average PM_{10} metal concentrations were monitored at three locations near the fire between July 13 and 19, 2020. Five metals have the RELs, but none of the PM_{10} metal concentrations exceeded either the 8-hour or chronic RELs during the fire.

NO_X concentrations were elevated on July 12-14, 2020 at the two closest monitoring sites to the fire indicating increased heavy/light duty engine activities related to the fire. The highest NOx concentration was 19 ppb at 6 PM on July 12, 2020 at the Sherman Elementary School site. However, it was below the 1-hour NO_2 NAAQS (100 ppb). After July 12, 2020, NO_X concentrations were within or lower than the historical NO_X range at the Chula Vista site.

Fifty-six VOCs were analyzed from 24 canister samples collected at 22 locations between July 12 and 19, 2020. 32 toxic compounds were higher than the median concentrations of two routine monitoring sites in San Diego County. Among them, several toxic compounds such as benzene and styrene showed elevated levels on July

12, 2020. However, none of the VOCs exceeded the acute RELs for 30-second samples nor 8-hour RELs for 5-hour samples.

Twenty four-hour average VOCs were monitored at the Sherman Elementary School site between October 25, 2019 and December 29, 2020. Of the 32 compounds selected in the SDAPCD emergency VOC monitoring analyses, 14 compounds that had 8-hour RELs or chronic RELs were analyzed. Among them, none of the VOCs exceeded the 8-hour RELs or chronic RELs during the fire.

O_2 concentrations monitored by the Navy between July 13 and 20, 2020 were within normal levels. The highest H_2S concentration was 1 ppm. The highest CO concentration was 16 ppm at 3PM on July 12, 2020. The highest VOC concentration was 4.2 ppm at 3PM on July 12, 2020. Between July 13 and 20, 2020, 81% of the Navy observations showed that the smoke traveled between the northeast, east, and southeast.

Pollution rose plots for July 13, 2020 at the regulatory monitoring sites have shown higher $PM_{2.5}$ concentrations coming from the direction of the fire. Twenty four-hour forward trajectories show that the air parcel from the fire travelled over Sherman-Elementary and El Cajon Elementary Schools indicating the fire plume may have impacted BC and $PM_{2.5}$ concentrations.

Toxic pollutants emitted from the navy ship fires are less well known. Part of the smoke from the USS Bonhomme Richard fire could be from burning plastics. The open burning of plastic material releases particulate matter, total organic carbon, polycyclic aromatic hydrocarbons, and toxic gases. Also, particulate soot and residue solid ash from open combustion of plastics include high concentrations of Na, Ca, Mg, Si and Al. However, the pertinent monitoring data were not available to support any analytical conclusions for most of these chemicals emitted during the fire.

Appendix G. In-depth Analyses of Potential Health Impacts

Research Division

California Air Resources Board

USS Bonhomme Richard Fire: In-depth Analyses of Potential Health Impacts

In considering the health impacts from the ship fire it is important to note what information we have and what must be gathered from other sources. As noted in the previous section of the document, PM2.5, PM10, black carbon and NOx as well as VOC were measured during the fire, although there were some concerns on the timing of the monitoring and PAHs were not measured during the ship fire. However, we do not know all the pollutants that can be produced by a ship fire. Also, since there are no real studies of the health impacts of smoke from ship fires, we need to rely on the extensive knowledge of the impacts of PM2.5 on health and the growing knowledge of the effects of wildfire pollution on health to understand the potential health impacts from a ship fire. But we understand this will not be a direct comparison to health impacts from this ship fire since we do not have the data on all the potential pollutants that could have been produced.

The health impacts of PM2.5 are very well documented, and there is a growing list of studies that have established the health impacts of exposure to wildfire smoke. Short-term exposure (days or weeks) to PM2.5 and wildfire smoke has been strongly linked to increasing severity of asthma; other respiratory disease, such as chronic obstructive pulmonary disease (COPD); inflammation or infections, including bronchitis and pneumonia; emergency department visits; and hospital admissions. Long-term exposure to PM2.5 is linked to a wide range of human health effects, such as respiratory and heart-related illnesses and hospitalizations, adverse brain effects, depression, memory loss, learning disorders, reduced lung function growth in children and premature death.[16]

A review of recent studies on the impacts of wildfire smoke has found worsening of respiratory and cardiovascular disease with children and the elderly and those with preexisting conditions as the most sensitive groups[17] and greater effects were seen for PM2.5 from wildfire compared to other sources of PM2.5.[18] Most of the impacts seen with wildfire smoke exposure are related to respiratory disease exacerbations and impacts including increased

[16] U.S. EPA. 2019. Integrated Science Assessment (ISA) for Particulate Matter (Final Report, 2019). U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-19/188, 2019.

[17] Liu, J. C., Pereira, G., Uhl, S. A., Bravo, M. A., & Bell, M. L. (2015). A systematic review of the physical health impacts from non-occupational exposure to wildfire smoke. Environmental research, 136, 120–132. https://doi.org/10.1016/j.envres.2014.10.01 (link)

[18] Brian J. Malig, David Fairley, Dharshani Pearson, Xiangmei Wu, Keita Ebisu, Rupa Basu. Examining fine particulate matter and cause-specific morbidity during the 2017 North San Francisco Bay wildfires. Science of The Total Environment. 2021. 787: 147507. ISSN 0048-9697. https://doi.org/10.1016/j.scitotenv.2021.147507 (link)

emergency room visits, particularly in young children.[19] [,20] Hospitalizations have also been seen associated with wildfire exposure for respiratory causes including asthma exacerbations,[21] with women more likely to seek care for asthma than men,[22] and the highest impact is seen in the downwind smoke plumes.[23,24] Also increased rates of visits for numerous cardiovascular disease outcomes have been seen in adults with those aged>65 years being the most vulnerable.[25] Mortality has also been associated with wildfire smoke with cardiorespiratory-related deaths (predominantly among the elderly). The mean estimated total mortality-related cost associated with the 2003 southern California wildfire event is approximately one billion U.S. dollars (2008 U.S. dollars).[26]

Therefore, it is clear from an analysis of studies in California and elsewhere that exposure to particulate air pollution from wildfire smoke is linked to health impacts, which range from eye and throat irritation to serious health concerns and mortality. In fact, the public described increases in headache and eye, throat, and sinus irritation (see Appendix D) and these impacts are seen with smoke and particulate pollution exposures.

In addition to particulate matter, fires from burning structures can release toxic compounds including Polycyclic Aromatic Hydrocarbons (PAHs) and Volatile Organic Compounds (VOCs) as well as metals, including lead. All these toxic compounds have serious health effects from chronic exposures and lead is particularly concerning due to possible effects of adverse brain development in children. CARB has led efforts to reduce lead exposures, including cleaner

[19] Hutchinson JA, Vargo J, Milet M, French NHF, Billmire M, et al. (2018) The San Diego 2007 wildfires and Medi-Cal emergency department presentations, inpatient hospitalizations, and outpatient visits: An observational study of smoke exposure periods and a bidirectioncase-crossover analysis. PLOS Medicine 15(7): e1002601. https://doi.org/10.1371/journal.pmed.1002601 (link)

[20] Leibel S, Nguyen M, Brick W, Parker J, Ilango S, Aguilera R, Gershunov A, Benmarhnia T. Increase in Pediatric Respiratory Visits Associated with Santa Ana Wind-Driven Wildfire Smoke and PM2.5 Levels in San Diego County. Ann Am Thorac Soc. 2020 Mar;17(3):313-320. doi: 10.1513/AnnalsATS.201902-150OC. PMID: 31860802 (link)

[21] Aguilera, R., Corringham, T., Gershunov, A. et al. Wildfire smoke impacts respiratory health more than fine particles from other sources: observational evidence from Southern California. Nat Commun 12, 1493 (2021). https://doi.org/10.1038/s41467-021-21708 (link)

[22] Colleen E. Reid, Michael Jerrett, Ira B. Tager, Maya L. Petersen, Jennifer K. Mann, John R. Balmes. Differential respiratory health effects from the 2008 northern California wildfires: A spatiotemporal approach. Environmental Research. 2016. 150: 227-235. ISSN 0013-9351. https://doi.org/10.1016/j.envres.2016.06.012 (link) \

[23] Aguilera, R., Hansen, K., Gershunov, A., Ilango, S. D., Sheridan, P., & Benmarhnia, T. (2020). Respiratory hospitalizations and wildfire smoke: a spatiotemporal analysis of an extreme firestorm in San Diego County, California. Environmental epidemiology (Philadelphia, Pa.), 4(5), e114. https://doi.org/10.1097/EE9.0000000000000114 (link)

[24] Delfino RJ, Brummel S, Wu J, et al. The relationship of respiratory and cardiovascular hospital admissions to the southern California wildfires of 2003. Occupational and Environmental Medicine 2009;66:189-197 (link)

[25] Wettstein ZS, Hoshiko S, Fahimi J, Harrison RJ, Cascio WE, Rappold AG. Cardiovascular and Cerebrovascular Emergency Department Visits Associated with Wildfire Smoke Exposure in California in 2015. J Am Heart Assoc. 2018 Apr 11;7(8):e007492. doi: 10.1161/JAHA.117.007492. PMID: 29643111; PMCID: PMC6015400 (link)

[26] Ikuho Kochi, Patricia A. Champ, John B. Loomis, Geoffrey H. Donovan. Valuing mortality impacts of smoke exposure from major southern California wildfires. Journal of Forest Economics. 2012. 18: 61-75. (link)

fuels regulations, and identified lead as a "toxic air contaminant" in 1997.[27] The levels of lead measured during the ship fire did not exceed the health-based standards set for exposure and the Navy indicated that lead paint was not used on the ship.[28] National health-based air quality standards for lead are based on chronic exposure to lead over a 3 month average concentration, which is different than the type of exposure experienced in the Navy fire. More information on lead health effects is available on the EPA's lead NAAQS website.

PAH are known to be a risk for cancer, mostly with occupational exposures. Short term exposure is not associated with a high risk of toxicity (U.S. Center for Disease Control Agency for Toxic Substances and Disease Registry - CDC ATSDR). The health impacts of exposure to formaldehyde (U.S. CDC ATSDR) include irritation of the eyes, nose, and throat, along with increased tearing, and could be immediately dangerous to life and health under extremely high concentration. A study of long-term effects of the exposure to formaldehyde in workplace air found more cases of cancer of the nose and throat (nasopharyngeal cancer) than expected, but the results were inconsistent. A review of studies listed hazardous air pollutants (including formaldehyde and several VOC mixtures) that can exacerbate or induce asthma.[29]

As we mentioned, there are no real studies on the health impacts of smoke from burning ships, however, studies have been conducted on urban firefighters that are exposed to smoke from the burning of industrial facilities and vehicles. Most of these studies have found an increase in the risks of cancer in urban firefighters[30] including an increased risk of mortality from cancers.[31] In a study of U.S. firefighters, investigators reported an excess of lung, digestive, and urinary cancers, and a rare cancer of the lung - mesothelioma (associated with

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[27] California Air Resources Board (CARB) Lead & Health, arb.ca.gov/resources/lead-and-health; World Health Organization (WHO) Lead Poisoning and Health, August 2019.; U.S. EPA. (2014). Policy Assessment for the Review of the Lead National Ambient Air Quality Standards. Research Triangle Park, NC. Office of Air Quality Planning and Standards, Health and Environmental Impacts Division. U.S. EPA. EPA-452/R-14-001 May 2014. Available at: epa.gov/ttn/naaqs/standards/pb/data/140501_pa_pb_fin.pdf

[28] The USS Bonhomme Richard was a conventionally powered amphibious assault ship. At the time of the fire, many items were stored on board the ship and burned, including tri-wall boxes, three fueled vehicles, pallets of oil drums, gas cylinders, combustible material, oxygen cylinders, and scaffolding. The Navy is not able to confirm whether other items or materials ignited or burned in the fire. However, the ship was commissioned in 1998, which is 9 years after the EPA issued its asbestos ban. Like other ships of its kind, it contained significant amount of steel pipe and insulated wire to support plumbing, heating, communication, and electrical support of the vessel. Traditionally, paints (none of them being lead based) and resins, fire-resistant adhesives, lube oils, and small equipment that may contain fuels may have been located aboard the vessel in contractor hazmat lockers when not in use. There were no weapons onboard the vessel with the exception of a small amount of small arms bullets that remained in ready service lockers. Additionally, there were no aircraft or landing vessels on board. The ship was not under radiological controls that would indicate it was a source for radiological materials.

[29] Leikauf G. D. (2002). Hazardous air pollutants and asthma. Environmental health perspectives, 110 Suppl 4(Suppl 4), 505–526. https://doi.org/10.1289/ehp.02110s4505

[30] Soteriades ES, Kim J, Christophi CA, Kales SN. Cancer Incidence and Mortality in Firefighters: A State-of-the-Art Review and Meta-Analysis. Asian Pac J Cancer Prev. 2019 Nov 1;20(11):3221-3231. doi: 10.31557/APJCP.2019.20.11.3221. PMID: 31759344; PMCID: PMC7063017.

[31] Pinkerton L, Bertke SJ, Yiin J, et al, Mortality in a cohort of US firefighters from San Francisco, Chicago and Philadelphia: an update. Occupational and Environmental Medicine 2020;77:84-93.

asbestos exposure).[32] Recently, the investigators reported excess leukemia and excess chronic obstructive pulmonary disease (COPD)-related deaths associated with the amount of time spent at fires.[21] Few studies have found noncancer effects in the health of urban firefighters and the results were inconsistent.[33] It is always important to remember that firefighters will receive a higher exposure to the smoke from urban fires as an occupational hazard than the surrounding neighborhoods.

The levels of PM2.5, toxics, and lead measured during the ship fire did not exceed the standards set for exposure. However, the community reported health outcomes during the ship fire (see appendix D). It is important to note that an individual's exposure can be different from that recorded by the monitors due to wind patterns and where the monitors are located. In addition, not all possible toxins were measured during the ship fire and impacts of short-term exposure to toxics are not always known. In addition to the other possible health impacts, the fire had an impact of the lives of the community members, who had to shelter in place to avoid smoke exposure. Although this is highly recommended to reduce exposure, people need to have a well-functioning system with a filter and air conditioning, since this fire took place during hotter weather, and there can be increased expense and stress in being confined indoors. Therefore, although it is comforting that the levels measured were below the standards, it cannot be stated that there were no health impacts from the fire.

Nearby community members expressed concern about a burning plastic smell during the Navy Ship Fire. It was possible that some of the smoke from the Navy Ship Fire was from burning plastics.[17] According to the literature, the open burning of plastic material releases particulate matter, total organic carbon, polycyclic aromatic hydrocarbons, dioxin, methyl chloride, and other toxic gases. In addition, particulate soot and residue solid ash from open combustion of plastics can include high concentrations of Na, Ca, Mg, Si and Al. However, the pertinent monitoring data were not available to support any analytical conclusions for most of these chemicals during the Navy Ship Fire. Appendix B has additional reference material on health effects that CARB staff compiled for interested community members that are beyond the scope of this AAR.

[32] Booze et al., Journal of Occupational and Environmental Hygiene 1: 296–305, 2004; Coker et. al., J Occup Environ Med. 61(3): e91–e94, 2019; Smith et. al., J Am Heart Assoc. 18; 7(18): e009446, 2018. Finlay et.al., PLoS Curr. 4:e4f959951cce2c, 2012

[33] J. O. Crawford, R. A. Graveling, Non-cancer occupational health risks in firefighters, Occupational Medicine, Volume 62, Issue 7, October 2012, Pages 485–495, https://doi.org/10.1093/occmed/kqs116