

The Santa Susana Field Laboratory and the Woolsey Fire

by

Daniel Hirsch

Maria Caine

Audrey Ford

January 8, 2019

COMMITTEE TO BRIDGE THE GAP

www.committeetobridgethegap.org

committeetobridgethegap@gmail.com

(831) 336-8003

Executive Summary

The devastating Woolsey Fire, which destroyed more than 1600 buildings and burned nearly 97,000 acres, began on November 8, 2018, at the Santa Susana Field Laboratory (SSFL), a contaminated former nuclear reactor and rocket testing facility on the Los Angeles/Ventura County line. The fire appears to have begun about a thousand yards from the site of the partial nuclear meltdown that had occurred at SSFL in 1959. Not being put out quickly, it burned all the way to the ocean, while raising public concern about the release of radioactive and toxic chemical contamination from the burning of so much of the polluted field lab.

The parties responsible for the contamination at the site—Boeing, NASA, and the Department of Energy (DOE)—had executed legally binding agreements to clean up SSFL by 2017, but the promised cleanup has not even started. Therefore, widespread radioactive and toxic chemical pollution remained throughout much of the site, in soil, vegetation, and groundwater. The fire covered 80% of SSFL, burning contaminated vegetation and denuding soil so that subsequent rains carried pollutants offsite.

This report details the 57 exceedances, in the period following the fire, of limits set by the LA Regional Water Quality Control Board to protect public health and the environment.¹ Stormwater left the site carrying elevated levels of such pollutants as gross alpha radioactivity, dioxins, lead, arsenic, and cyanide.

Nonetheless, at Boeing's request, the Water Board waived fines for almost all of these exceedances, saying, it had determined "that the effects of the fire could not have been prevented or avoided by the exercise of due care or foresight by Boeing....Boeing has a Fire Station onsite that immediately responded when the Woolsey Fire began...."

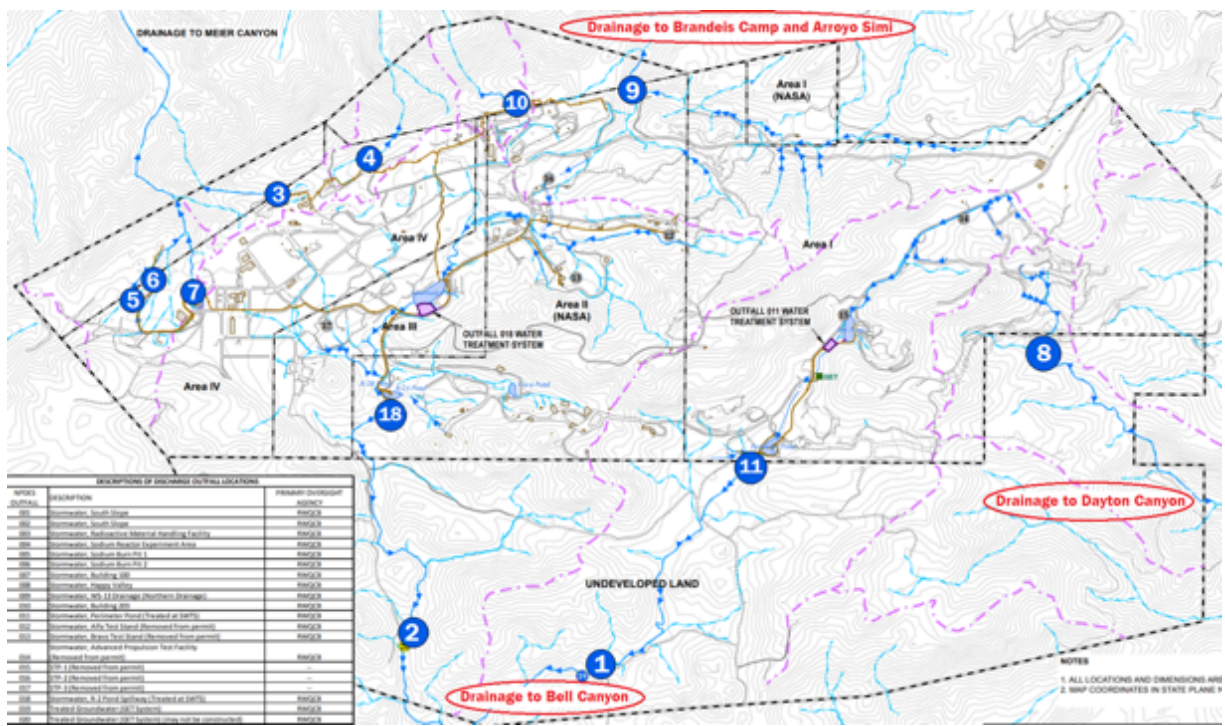
It has now been revealed that Boeing's single old fire truck broke down, unable to even reach the fire.² Furthermore, had Boeing and the other Responsible Parties lived up to their cleanup agreements and gotten the site cleaned up by 2017 as promised, many, if not all, of the breaches of pollution limits would not have occurred, because the source of their pollution would have been removed.

* The assistance of Ally Pecego in the preparation of this report is gratefully acknowledged.

Migration of Contaminants from the Santa Susana Field Laboratory in the Period Following the Woolsey Fire

The Woolsey Fire burned approximately 80% of SSFL destroying both vegetation and infrastructure. Piping responsible for moving stormwater to the treatment system at Silvernale Pond was destroyed, as well as the passive water treatment system at Outfall 018. The stormwater treatment system itself was also damaged due to proximity to the fire.³ Boeing, NASA, and DOE promised to have SSFL cleaned up by 2017. At the time of the fire, soil cleanup had not even begun. After the fire, stormwater from rain events on site carried contamination that was no longer captured by vegetation towards the outfalls and subsequently into the communities around SSFL. This is not to say that there were no exceedances in the period before the fire – there were roughly 350 from 2006 to the time of the Woolsey Fire and no year without exceedances – but they increased markedly in the wake of the fire.

57 exceedances of pollution limits relating to surface water leaving SSFL were reported in the period after the November 8th, 2018, Woolsey fire at SSFL.¹ The limits exceeded were established by the Los Angeles Regional Water Quality Control Board (RWQCB) in Boeing’s National Pollutant Discharge Elimination System (NPDES) permit as essential to protect public health and the environment. To determine if an exceedance has occurred, stormwater is collected at outfalls onsite and receiving water locations offsite, then measured for contaminant concentration. There are currently 12 active outfalls at SSFL, outfalls 1 – 11 and outfall 18. RWQCB and Boeing agreed that the increase in number of exceedances after November 8th were attributed to the fire.

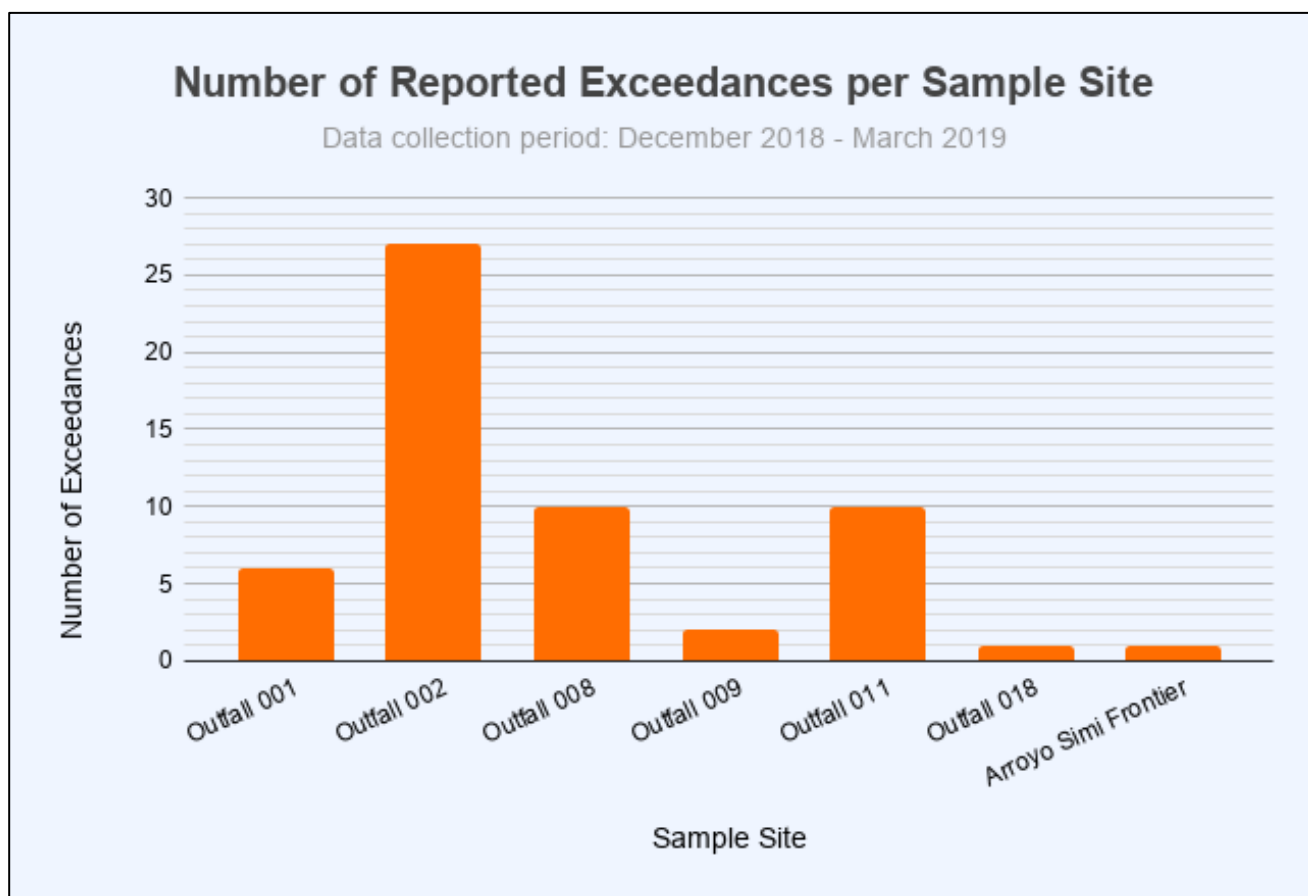


Outfall Locations at SSFL

¹ Exceedances reported by The Boeing Company to the Los Angeles Regional Water Quality Control Board for the last quarter of 2018 and the first quarter of 2019.
http://www.boeing.com/assets/pdf/aboutus/environment/santa_susana/ents/2018_4thQtr18_DMR_F.pdf and
http://www.boeing.com/assets/pdf/aboutus/environment/santa_susana/ents/2019_0515_1stQtr19_DMR_F.pdf The 2018 exceedances reported were all for releases after the Woolsey Fire.

There were:

- **6** exceedances at Outfall 001
- **27** exceedances at Outfall 002
- **10** exceedances at Outfall 008
- **2** exceedances at Outfall 009
- **10** exceedances at Outfall 011
- **1** exceedance at Outfall 018
- and **1** exceedance at the Arroyo Simi receiving water location.



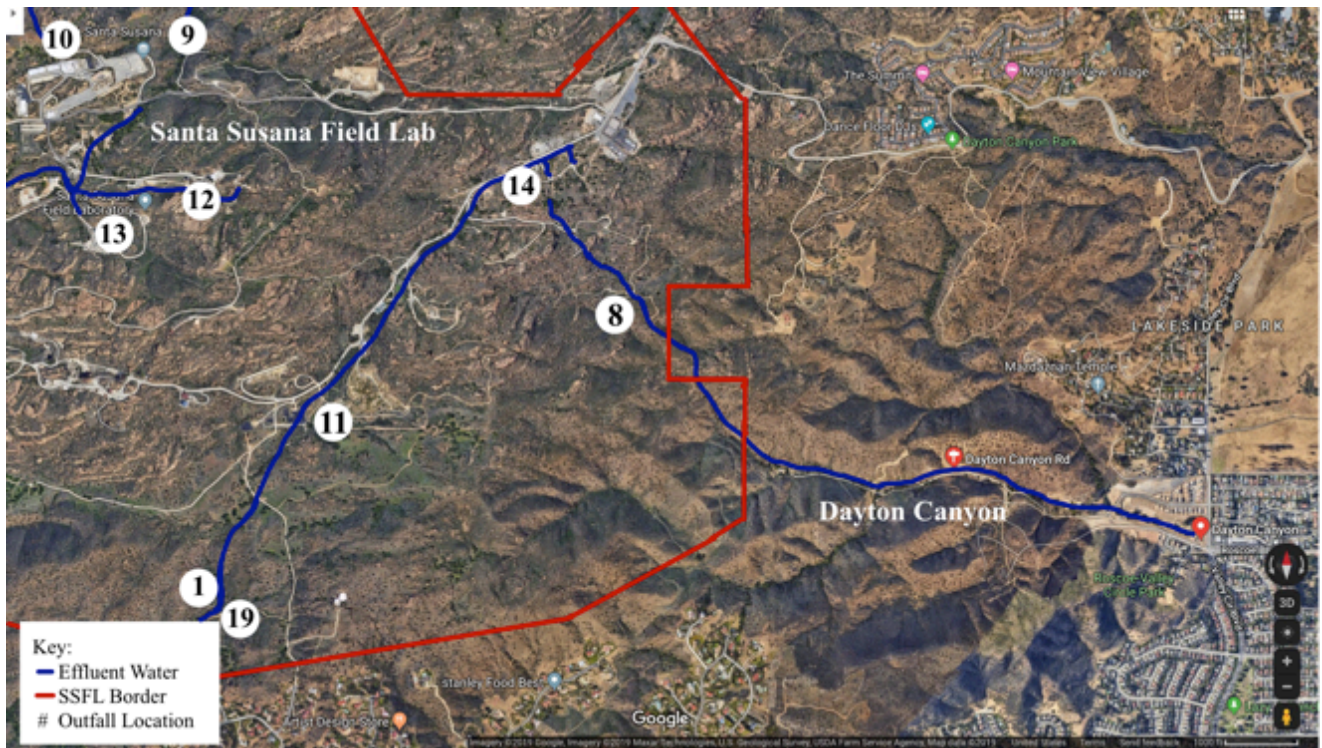
Contamination measured at the outfalls does not stay onsite. It flows offsite in the stormwater runoff, contamination the communities surrounding SSFL. The images on the following pages show how the effluent water moves from the lab into residential areas.



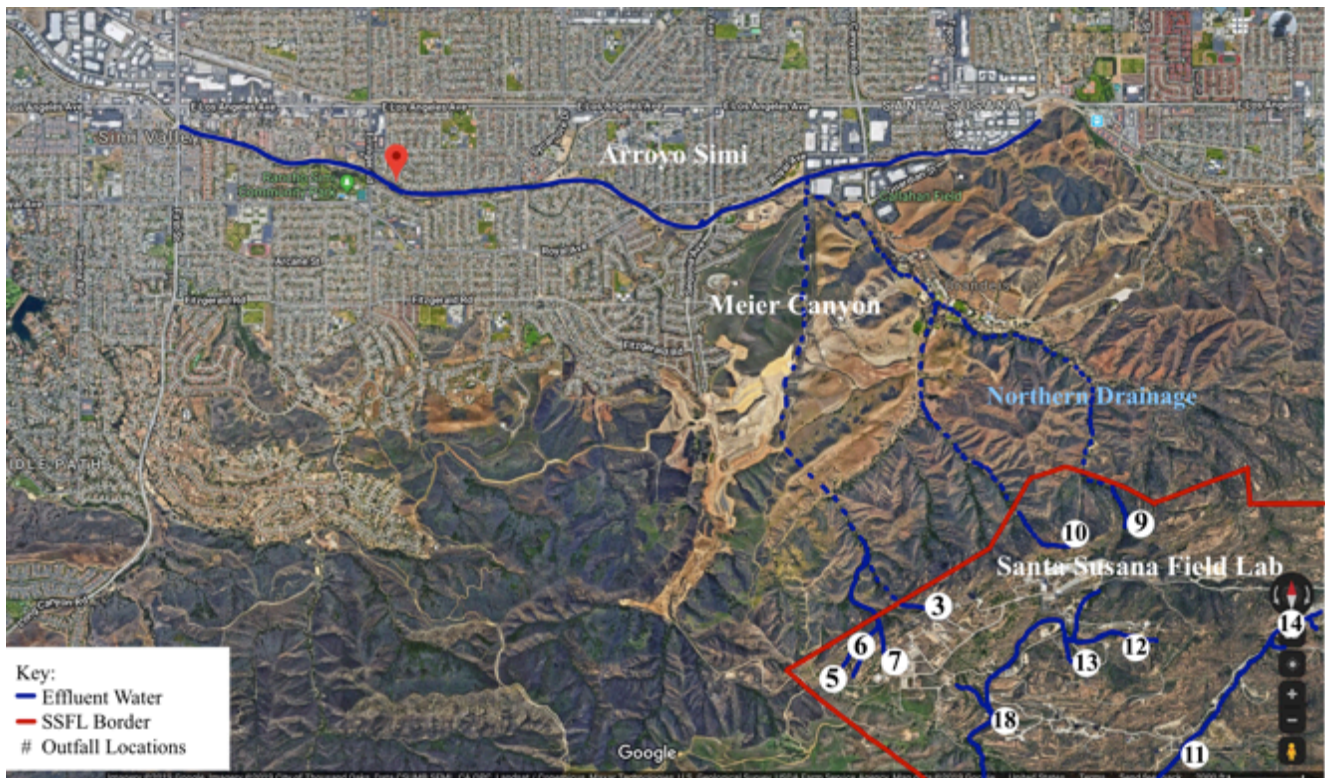
Water leaving Outfalls 001, 002, 011, and 018 drains into Bell Creek, which runs through the Bell Canyon neighborhood in Los Angeles County before entering the Los Angeles River.



Water from Outfall 008 drains into Dayton Creek, passing through the housing development in Dayton Canyon before entering the LA River.



Water from Outfall 009 passes through the children's camp at the Brandeis Bardin Institute before entering the Arroyo Simi, the main watercourse through Simi Valley.



Outfall exceedances are not just numbers on a page. Each exceedance is an occurrence of contamination that has made it offsite and could be causing devastating health effects in adults and children living in the communities surrounding SSFL.

The Contaminants Detected Above Permit Limits/Benchmarks² Were:

Copper

There were **5 recorded exceedances of copper** above the daily maximum benchmark/permit limit of 14 µg/L (micrograms per liter). The highest exceedance recorded was at a concentration of 52 µg/L at Outfall 002. This is more than quadruple the limit.

Iron

There were **12 recorded exceedances of iron** above the daily maximum benchmark/permit limit of 0.3 mg/L. The highest exceedance recorded was at a concentration of 98 mg/L at Outfall 002. This is 327 times the limit.

Lead

There were **9 recorded exceedances of lead** above the daily maximum benchmark/permit limit of 5.2 mg/L. The highest exceedance recorded was at a concentration of 88 mg/L at Outfall 002. This is 17 times the limit.

Selenium

There was **1 recorded exceedance of selenium** above the wet weather daily maximum benchmark limit of 8.2 µg/L. The exceedance was recorded at a concentration of 11 µg/L at Outfall 002. This is 30% above the limit.

Zinc

There were **3 recorded exceedances of zinc** above the daily maximum benchmark limit of 119 µg/L. The highest exceedance recorded was at a concentration of 430 µg/L at Outfall 002. This is quadruple the limit.

Cyanide

There was **1 recorded exceedance of cyanide** above the daily maximum benchmark limit of 9.5 µg/L. The exceedance was recorded at a concentration of 15 µg/L at Outfall 008. This is 60% above the limit.

² Boeing's NPDES permit for SSFL establishes two types of limits for pollutants in surface water, permit limits and benchmarks. They are the same numerical values, but trigger different responses when exceeded. Benchmarks presently apply to Outfalls 001 and 002; numerical limits to the other outfalls. The difference is that when the numerical limits are exceeded, Boeing can be fined; when it exceeds benchmarks, it is required to submit a report identifying what additional steps it will take to prevent recurrence. For this report, the benchmarks and numerical limits will be collectively referred to as "limits."

Dioxins (TCDD TEQ)

There were **6 recorded exceedances of Dioxins** above the daily maximum permit limit of 2.8E-08 µg/L. The highest exceedance recorded was at a concentration of 1.7E-07 µg/L at Outfall 011. This is 6 times the limit.

Gross Alpha Radioactivity

There were **4 recorded exceedances of Gross Alpha Radioactivity** above the daily maximum benchmark limit of 15 pCi/L. The highest exceedance recorded was at a concentration of 60.7±14.7 pCi/L at Outfall 002.³ This is quadruple the limit.

E. Coli

There was **1 recorded exceedance of bacteria *E. coli*** above the daily maximum limit of 235 MPN/100mL. The exceedance was recorded at Arroyo Simi Frontier at a concentration of 5,300 MPN/100mL. This is 23 times the limit.

Manganese

There were **8 recorded exceedances of manganese** above the daily maximum benchmark/permit limit of 50 µg/L. The highest exceedance recorded was at a concentration of 920 µg/L at Outfall 002. This is 18 times the limit.

Arsenic

There were **2 exceedances of arsenic** above the daily maximum benchmark/permit limit of 10.0 µg/L. The highest exceedance recorded was at a concentration of 17 µg/L at Outfall 002. This is 70% above the limit.

Nickel

There was **1 recorded exceedance of nickel** above the daily maximum permit limit of 86 µg/L. The exceedance was recorded at a concentration of 170 µg/L at Outfall 009. This is double the limit.

Sulfate

There was **1 recorded exceedance of sulfate** above the daily maximum benchmark limit of 300 mg/L. The exceedance was recorded at a concentration of 340 mg/L at Outfall 002.

Nitrate – N and nitrate + nitrite as Nitrogen (N)

There were **2 exceedances of Nitrate – N and nitrate + nitrite as Nitrogen (N)** above the daily maximum permit limit of 8 mg/L. The highest exceedance recorded was at a concentration of 8.6 mg/L for both at Outfall 008. Outfall 8 drains into Dayton Canyon.

³ The sample was also checked for uranium and radium, and only small amounts found, so naturally-occurring uranium or radium was not the cause for the elevated gross alpha reading. No measurements were reported for individual artificial alpha-emitting radionuclides such as plutonium-239.

pH

There was **1 recorded exceedance for pH** outside the permit range of 6.5 to 8.5. The exceedance was recorded at a concentration of 6.41.

The exceedances are summarized in the following chart.⁴

Contaminant	Regional Water Quality Control Board Limit	Reported Exceedance Value	How much larger was the exceedance than the limit?
Copper	14 µg/L	52 µg/L	4 times the limit
Iron	0.3 mg/L	98 mg/L	327 times the limit
Lead	5.2 mg/L	88 mg/L	17 times the limit
Selenium	8.2 µg/L	11 µg/L	1.3 times the limit
Zinc	119 µg/L	430 µg/L	4 times the limit
Cyanide	9.5 µg/L	15 µg/L	1.6 times the limit
Dioxins	2.8E-08 µg/L	1.7E-07 µg/L	6 times the limit
Gross Alpha	15 pCi/L	60.7±14.7 pCi/L	4 times the limit
E. Coli	235 MPN/100mL	5,300 MPN/100mL	23 times the limit
Manganese	50 µg/L	920 µg/L	18 times the limit
Arsenic	10.0 µg/L	17 µg/L	1.7 times the limit
Nickel	86 µg/L	170 µg/L	2 times the limit

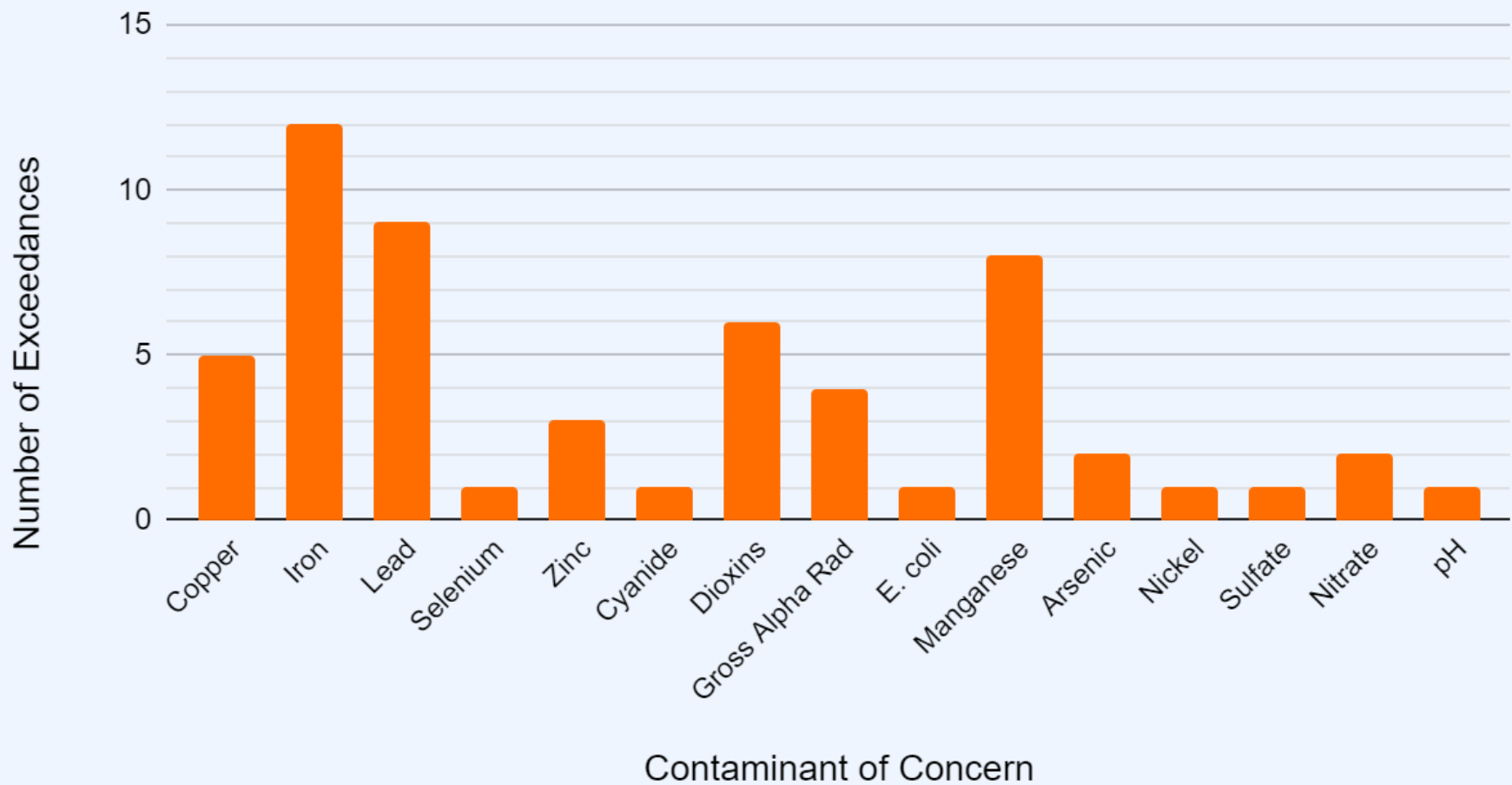
⁴ The chart does not include the exceedances for sulfate and Nitrate – N and nitrate + nitrite as Nitrogen (N), both of which were ten percent above their limits, and pH, which was outside the allowable range.

The continued migration of chemicals in excess of the reporting limits in the period after the Woolsey Fire are a great cause of concern. This was the second fire to burn at the field lab in the past 15 years, with a spike in off-site chemical migration being recorded after both occurrences.⁴ Given the impacts of climate change and the sites history, it is not unlikely that there will continue to be fires in the years to come.

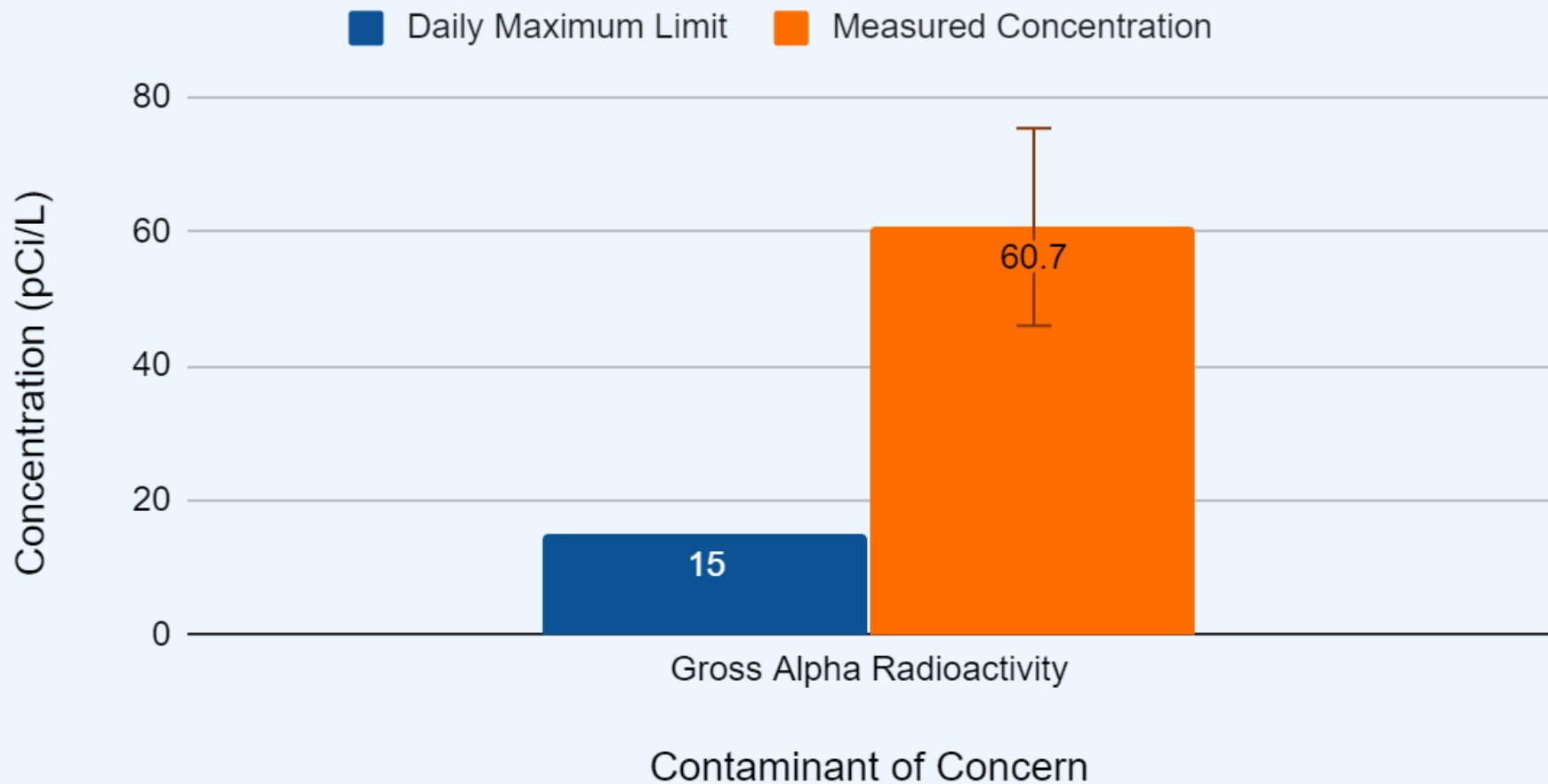
The following pages contain graphics that depict the number of exceedances by contaminant as well as the severity of the exceedance.

Number of Reported Exceedances per Contaminant

Data collection period: December 2018 - March 2019

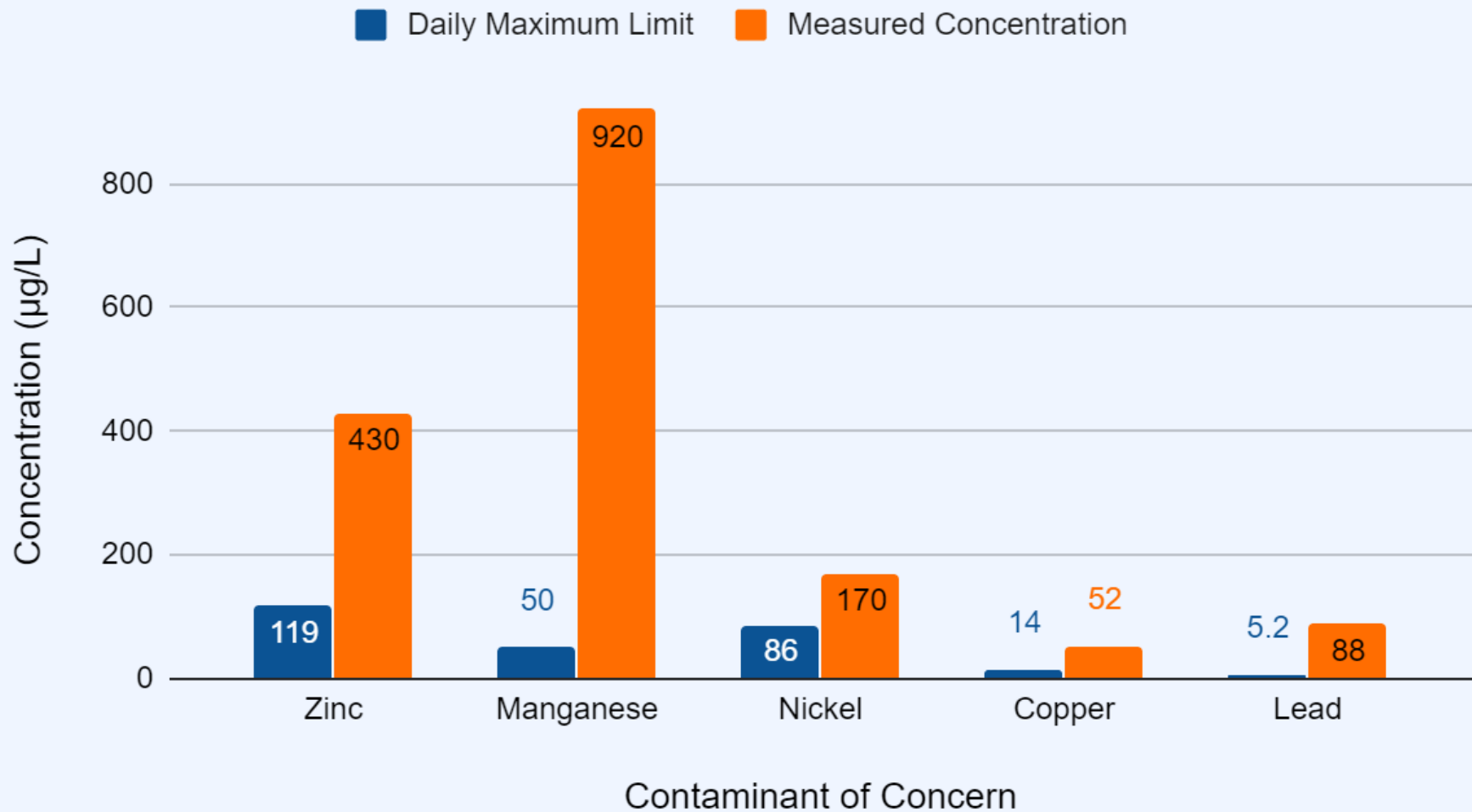


Maximum Measured Concentration of Contaminant versus Concentration Limit

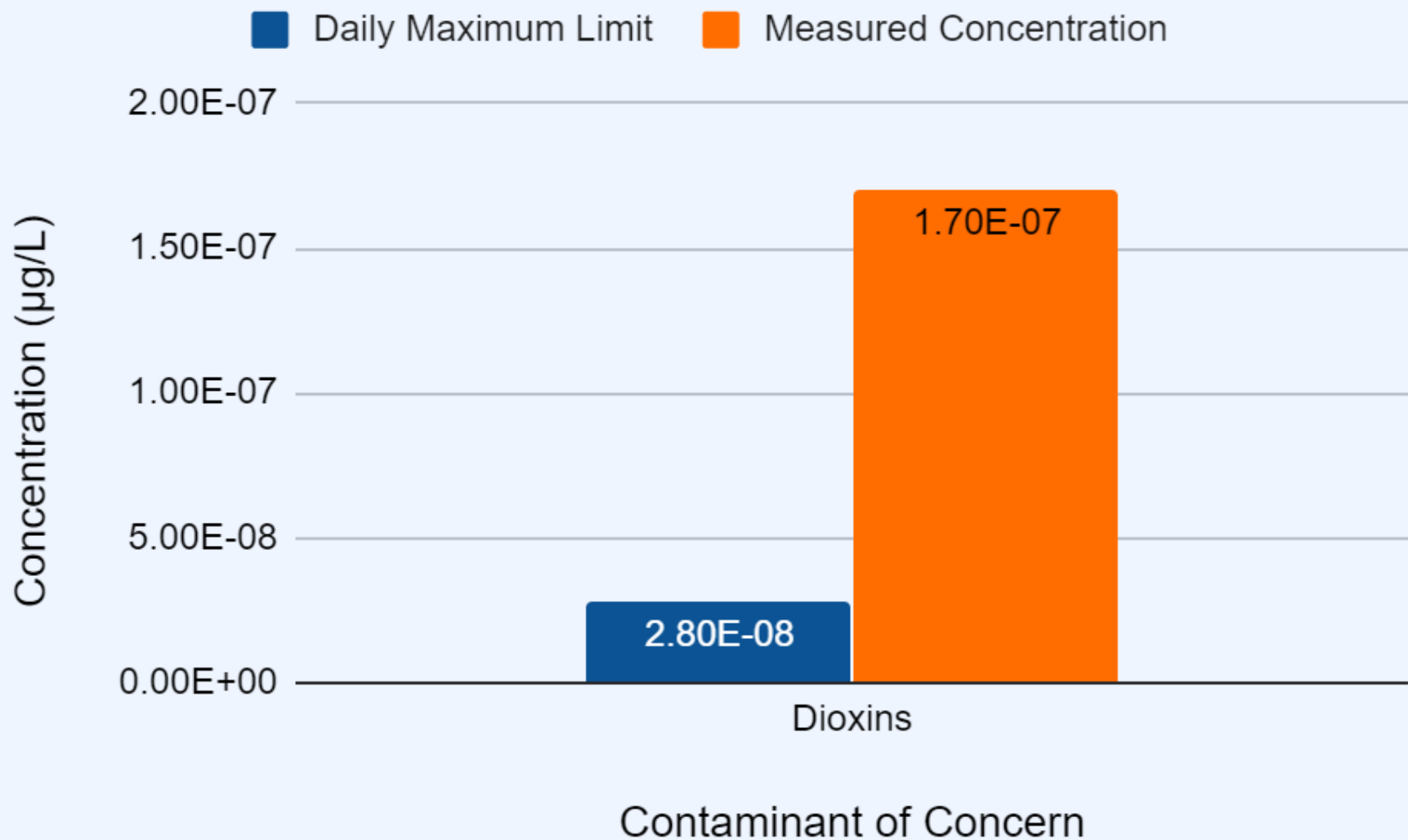


The bracketed line represents the margin of error for the gross alpha exceedance. Even the lowest possible value for this measurement was well above the limit of 15 pCi/L

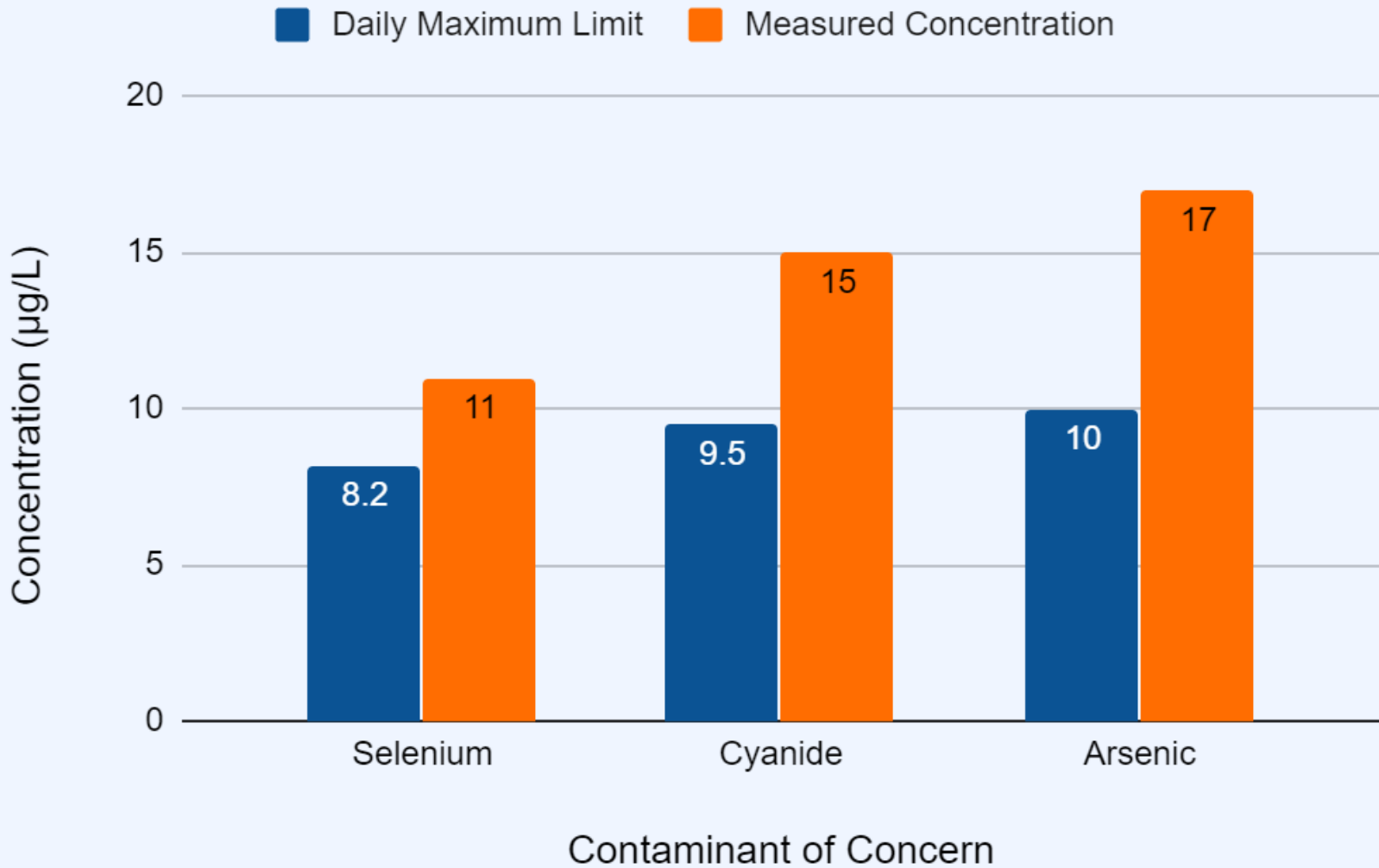
Maximum Measured Concentration of Contaminants versus Concentration Limits



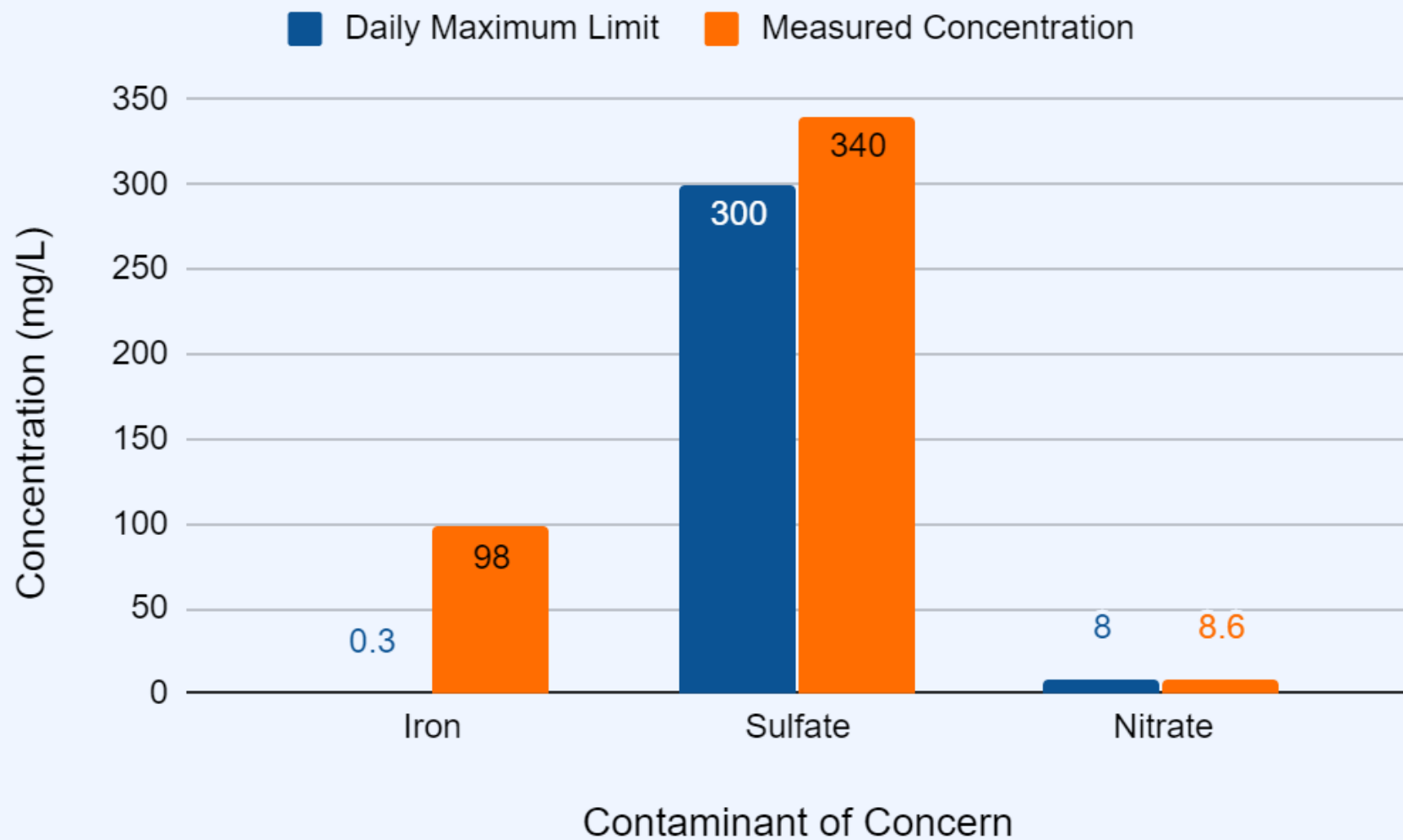
Maximum Measured Concentration of Contaminant versus Concentration Limit



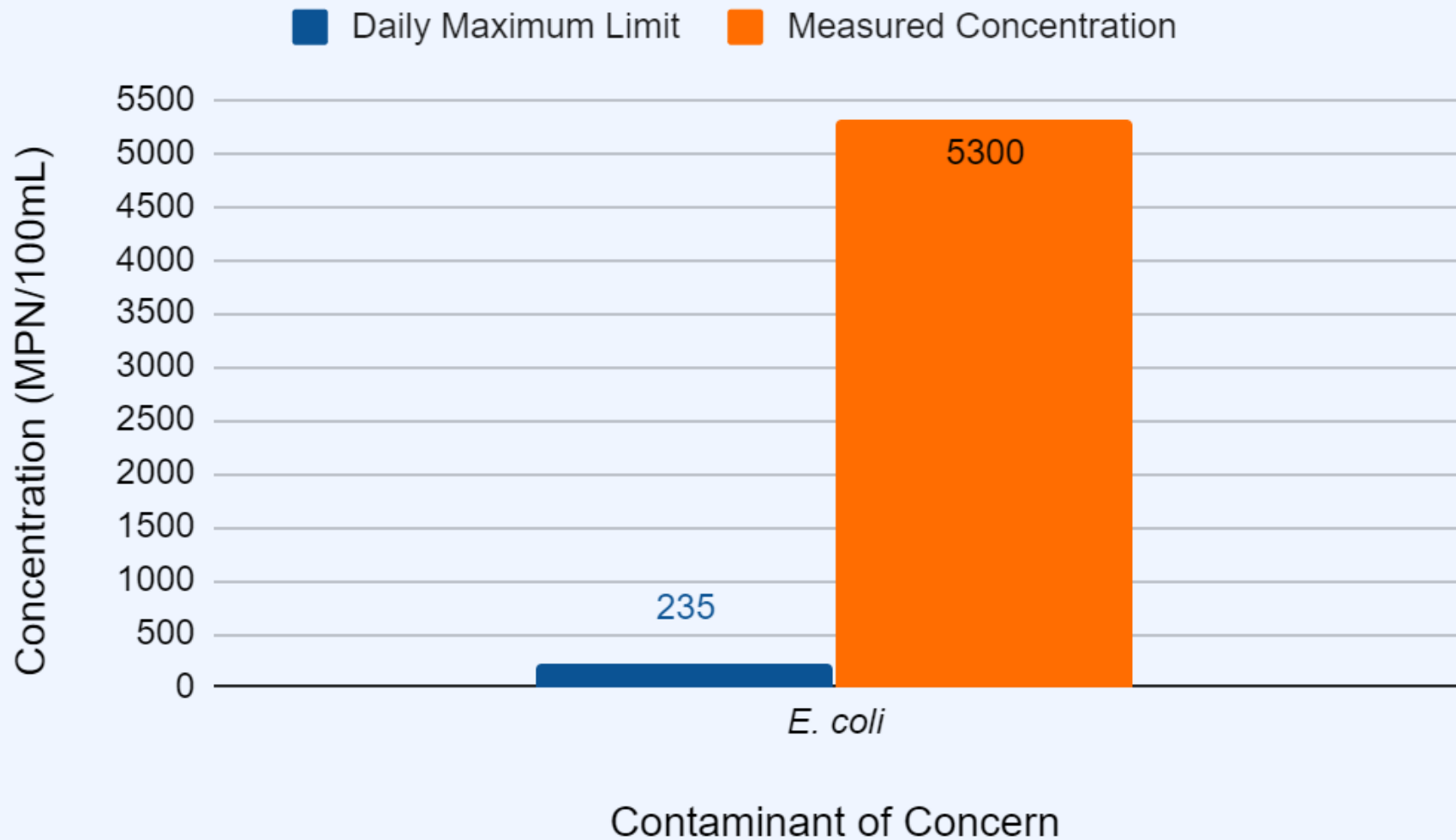
Maximum Measured Concentration of Contaminants versus Concentration Limits



Maximum Measured Concentration of Contaminants versus Concentration Limits



Maximum Measured Concentration of Contaminant versus Concentration Limit



The Regional Water Quality Control Board Waves SSFL's Fines

Boeing and the LA Regional Water Quality Control Board (RWQCB) both concede that the increased number of exceedances in the period following the Woolsey Fire was due to the fire. Boeing appealed to RWQCB in the period following the Woolsey Fire to request a relief from the mandatory minimum fines it had accrued as violations of the exceedance permits. RWQCB approved the request on the grounds that the exceedances were the result of the Woolsey Fire and “could not have been prevented or avoided by the exercise of due care or foresight by Boeing.”⁵

However, by agreeing to waive the fines, RWQCB is effectively stating that the Responsible Parties were in no way responsible for the high levels of contamination leaving SSFL. In truth, Boeing did not take due care to minimize exceedances before or after the fire. Due care would have been cleaning SSFL up, like Boeing, NASA, and DOE had agreed to do when it signed the 2007 Consent Order. Due care would have been properly maintaining the fire equipment so that the truck Boeing had on site could make it to the fire before breaking down. Due care would be acknowledging that fires happen frequently in California, and that the effects of climate change are only exacerbating this problem and so taking ample measure to ensure the site is as safe as possible before another fire happens. Had the responsible parties cleaned the site up, as promised, the fire would not have released such high levels of contamination and there would not have been exceedances for Boeing to appeal.

Conclusion

The high levels of exceedances at SSFL after the Woolsey Fire are indicative of the type of contamination on site. Writing off the fire as a chance occurrence is both dangerous and irresponsible. NASA, DOE, and Boeing must take responsibility for the contamination they left on site by cleaning it up as promised. The 57 exceedances are not just theoretical numbers – they are real values of dangerous chemical and radiological contamination that have real consequences on the communities surrounding SSFL. Ignoring the high possibility of another fire, there will continue to be exceedances if the responsible parties do not uphold their commitments and clean the site.

¹ Deborah Schoch, NBC 4, “Woolsey Fire Crippled Boeing Water Safety System at Toxics Site,” November 8, 2019, first reported that there were 57 exceedances and that the Water Board waived almost all fines. <https://www.nbclosangeles.com/news/local/Woolsey-Fire-Crippled-Boeing-Water-Safety-System-at-Toxics-Site-564677131.html>

² Jaclyn Cosgrove, “First Engine Broke Down on Route to Woolsey Fire, Sources Say. Blaze Grew at a Terrifying Rate,” *Los Angeles Times*, November 11, 2019.

³ Hugh Marley to David Dassler, June 27, 2019.

⁴ Boeing’s annual and quarterly monitoring reports show there was an increase in offsite chemical migration in the years following to the 2005 Topanga Fire.

⁵ Hugh Marley to David Dassler, June 27, 2019.