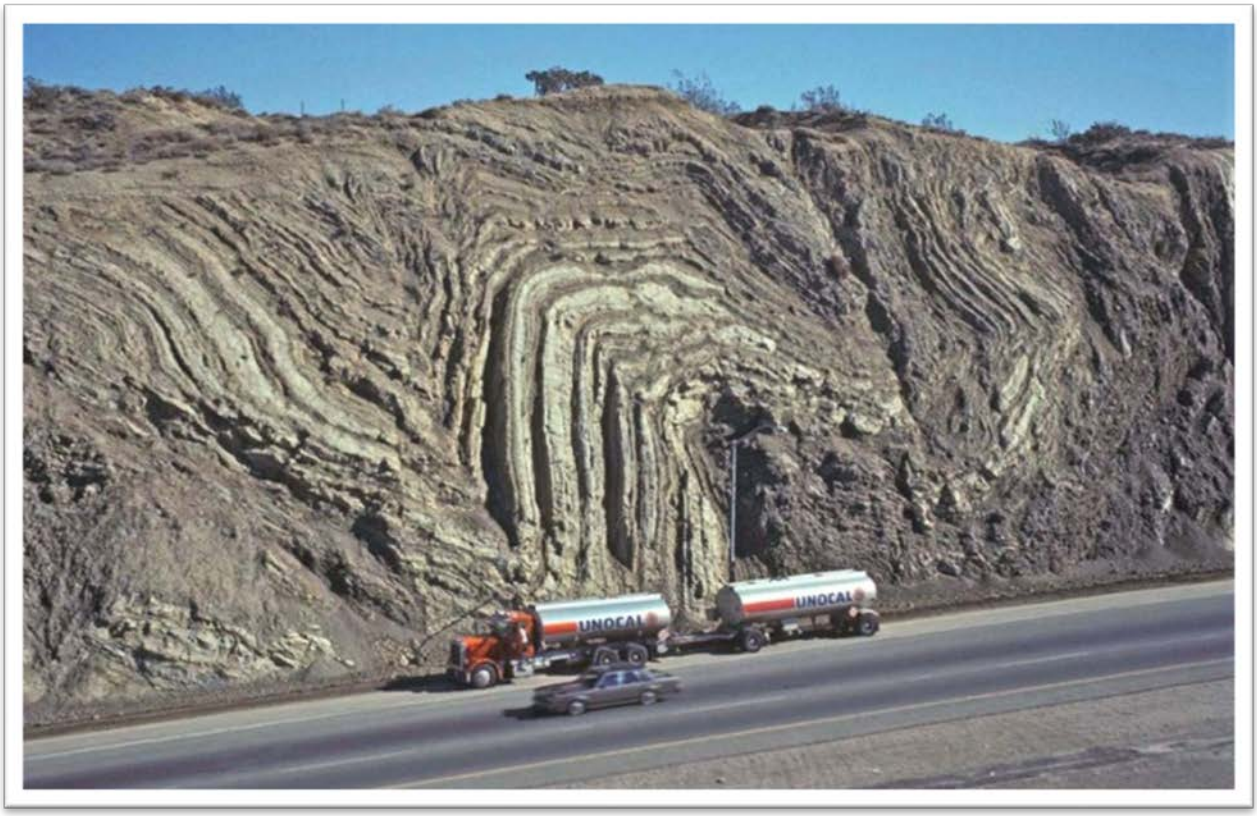
IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT



Blog: San Diego County Road S2 – Ocotillo to Warner Springs.
https://socalgeology.com/2016/04/21/blog-san-diego-county-road-s-2-ocotillo-to-warner-springs/

April 19, 2018
Exceptional Event Documentation
For the Imperial County PM_{10} Nonattainment Area

An exceedance of the National Ambient Air Quality Standard (NAAQS) for PM_{10} at the Brawley, Calexico, and Westmorland monitors in Imperial County, California on April 19, 2018

TABLE OF CONTENTS

SECTION PAGE

LIST OF FIGURES

FIGURE **PAGE**

LIST OF TABLES

TABLE **PAGE**

ACRONYM	DESCRIPTIONS
AOD	Aerosol Optical Depth
AQI	Air Quality Index
AQS	Air Quality System
BACM	Best Available Control Measures
BAM 1020	Beta Attenuation Monitor Model 1020
BLM	United States Bureau of Land Management
BP	United States Border Patrol
CAA	Clean Air Act
CARB	California Air Resources Board
CMP	Conservation Management Practice
DCP	Dust Control Plan
DPR	California Department of Parks and Recreation
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GOES-W/E	Geostationary Operational Environmental Satellite (West/East)
HC	Historical Concentrations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
INPEE	Initial Notification of a Potential Exceptional Event
ITCZ	Inter Tropical Convergence Zone
KBLH	Blythe Airport
KCZZ	Campo Airport
KIPL	Imperial County Airport
KNJK	El Centro Naval Air Station
KNYL/MCAS	Yuma Marine Corps Air Station
KPSP	Palm Springs International Airport
KTRM	Jacqueline Cochran Regional Airport (aka Desert Resorts Rgnl Airport)
PST	Local Standard Time
MMML/MXL	Mexicali, Mexico Airport
MODIS	Moderate Resolution Imaging Spectroradiometer
MPH	Miles Per Hour
MST	Mountain Standard Time
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NCEI	National Centers for Environmental Information
NEAP	Natural Events Action Plan
NEXRAD	Next-Generation Radar

NOAA	National Oceanic and Atmospheric Administration
nRCP	Not Reasonably Controllable or Preventable
NWS	National Weather Service
PDT	Pacific Daylight Time
PM_{10}	Particulate Matter less than 10 microns
$PM_{2.5}$	Particulate Matter less than 2.5 microns
PST	Pacific Standard Time
QA/QC	Quality Assured and Quality Controlled
QCLCD	Quality Controlled Local Climatology Data
RACM	Reasonable Available Control Measure
RAWS	Remote Automated Weather Station
SIP	State Implementation Plan
SLAMS	State Local Ambient Air Monitoring Station
SMP	Smoke Management Plan
SSI	Size-Selective Inlet
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTC	Coordinated Universal Time
WRCC	Western Regional Climate Center

I Introduction

In 2007, the United States Environmental Protection Agency (US EPA) adopted the "Treatment of Data Influenced by Exceptional Events Rule" (EER)[1] to govern the review and handling of certain air quality monitoring data for which the normal planning and regulatory processes are not appropriate. Under the terms of the EER, the US EPA may exclude monitored exceedances of the National Ambient Air Quality Standard (NAAQS) if a State adequately demonstrates that an exceptional event caused the exceedance.

The 2016 revision to the EER added sections 40 CFR §50.1(j)-(r) [Definitions], 50.14(a)-(c) and 51.930(a)-(b) to 40 Code of Federal Regulations (CFR). These sections contain definitions, criteria for US EPA concurrence, procedural requirements and requirements for State demonstrations. The demonstration must satisfy all of the rule criteria for US EPA to concur with the requested exclusion of air quality data from regulatory decisions.

Title 40 CFR §50.14(c)(3)(iv) outlines the elements that a demonstration must include for air quality data to be excluded:

TABLE 1-1 TITLE 40 CFR §50.14(c)(3)(iv) CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM_{10})		DOCUMENT SECTION
1	A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)	Pg. 9
2	A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation	Pg. 18
3	Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section	Pg. 27
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	Pg. 34
5	A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event	Pg. 41

[1] "Treatment of Data Influenced by Exceptional Events; Final Guidance", 81 FR 68216, October 2, 2016

Aside from the above, a State must demonstrate that it has met several procedural requirements during the demonstration process, including:

	TABLE 1-2 PROCEDURAL CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM_{10})	DOCUMENT SECTION
1	**Public Notification [40 CFR §50.14(c)(1)]** – In accordance with mitigation requirement at 40 CFR 51.930(a)(1), notification to the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard	Pg. 3 and Appendix C
2	**Initial Notification of Potential Exceptional Event [40 CFR §50.14(c)(2)]** - Submission to the Administrator of an Initial Notification of Potential Exceptional Event and flagging of the affected data in US EPA's Air Quality System (AQS) as described in 40 CFR §50.14(c)(2)(i),	Pg. 3
3	**Public Comment Process [40 CFR §50.14(c)(3)(v)]** - Documentation of fulfillment of the public comment process described in 40 CFR §50.14(c)(3)(v), and	Pg. 4 and Appendix C
4	**Mitigation of Exceptional Events [40 CFR §51.930]** - Implementation of any applicable mitigation requirements (Mitigation Plan) as described in 40 CFR §51.930	Pg. 4

The Imperial County Air Pollution Control District (ICAPCD) has been submitting criteria pollutant data since 1986 into the US EPA's Air Quality System (AQS). In Imperial County, prior to 2017, Particulate Matter Less Than 10 Microns (PM_{10}) was measured by either Federal Reference Method (FRM) Size Selective Instruments (SSI) or Federal Equivalent Method (FEM) Beta Attenuation Monitor's, Model 1020 (BAM 1020). Effective 2017 Imperial County stopped utilizing FRM instruments relying solely on BAM 1020 monitors to measure PM_{10}. It is important to note that the use of non-regulatory data within this document, typically continuous PM_{10} data prior to 2013, measured in local conditions, does not cause or contribute to any significant differences in concentration difference or analysis.

As such, this report demonstrates that a naturally occurring event caused an exceedance observed on Thursday, April 19, 2018 which elevated particulate matter within San Diego, Riverside, Imperial and Yuma counties and affected air quality. The analyses contained in this report includes regulatory and non-regulatory data that provides support for the elements listed in **Table 1-1** and **Table 1-2**. This demonstration substantiates that this

event meets the definition of the US EPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER)[2].

I.1 Public Notification [40 CFR §50.14(c)(1)]

The ICAPCD utilizes a web-based public notification process to alert the public of forecasted weather conditions and potential changes in ambient air concentrations that may affect the public. The ICAPCD identifies these public notifications as Advisory Events. On April 18, 2018 and April 19, 2018 the ICAPCD published advisories concerning the potential for elevated concentrations of particulate matter caused by gusty winds preceding the passage of a trough of low-pressure by Thursday, April 19, 2018. Although, there was a chance for light precipitation, the expectation was that it would not reach Imperial County. Needless to say, the gusty winds were expected to begin picking up Wednesday night (April 18, 2018) and continue through Thursday. Along with the April 19, 2018 advisory the ICAPCD published a wind advisory for all of Imperial County, identifying west winds between 20 to 30 mph with potential gusts up to 40 mph. Finally, aside from the wind and potential for showers, the passage of the trough was expected to bring cooler weather. **Appendix C** contains copies of notices pertinent to the April 19, 2018 event.

I.2 Initial Notification of Potential Exceptional Event (INPEE) [40 CFR §50.14(c)(2)]

When States intend to request the exclusion of one or more exceedances of a NAAQS as an exceptional event a notification to the Administrator is required. The notification process identified within the EER as the Initial Notification of Potential Exceptional Event (INPEE) is twofold: to determine whether identified data may affect a regulatory decision and whether a State should develop/submit an EE Demonstration.

On Thursday, April 19, 2018, a naturally occurring event elevated particulate matter within San Diego, Riverside and Imperial Counties, causing an exceedance at the Brawley (06-025-0007), Calexico (06-025-0005), and Westmorland (06-025-4003) air quality monitors. Subsequently, the ICAPCD made a formal written request to the California Air Resources Board (CARB) to place preliminary flags on SLAMS measured PM_{10} hourly concentrations from the Brawley, Calexico, and Westmorland monitors on April 19, 2018. After review, CARB submitted the INPEE, for the April 19, 2018 event in July of 2019. The submitted request included a brief description of the meteorological conditions for April 19, 2018

[2] "Treatment of Data Influenced by Exceptional Events; Final Guidance", 81 FR 68216, October 2, 2016

indicating that a potential natural event occurred. The ICAPCD has engaged in discussions with US EPA Region IX regarding the demonstration prior to formal submittal.

I.3 Public Comment Process [40 CFR §50.14(c)(3)(v)(A-C)]

(A) The CARB and USEPA have reviewed and commented on the draft version of the April 19, 2018 exceptional event prepared by the ICAPCD. After addressing all substantive and non-substantive comments by both CARB and USEPA the ICAPCD has published a notice of availability in the Imperial Valley Press announcing a 30-day public review process. The published notice invites comments by the public regarding the request, by the ICAPCD, to exclude the measured concentrations of 334 $\mu g/m^3$ measured by the Brawley monitor; 178 $\mu g/m^3$ measured by the Calexico monitor; and 186 $\mu g/m^3$ measured by the Westmorland monitor on April 19, 2018.

(B) Concurrently with the Public Review period for the April 19, 2018 exceptional event, the ICAPCD is formally submitting to CARB for remittance to USEPA the Final April 19, 2018 exceptional event.

(C) Upon the ending of the review period the ICAPCD will remit to CARB and USEPA all comments received during the Public Review period along with a formal letter addressing any comments that dispute or contradict factual evidence in the demonstration.

The ICAPCD acknowledges that with the submittal to US EPA of the 2018 exceptional events, there is supporting evidence of documented recurring seasonal events that affect air quality in Imperial County.

I.4 Mitigation of Exceptional Events [40 CFR §51.930]

According to 40 CFR §51.930(b) all States having areas with historically documented or known seasonal events, three events or event seasons of the same type and pollutant that recur in a 3-year period, are required to develop and submit a mitigation plan to the US EPA.

The ICAPCD received notice from US EPA September 15, 2016 identifying Imperial County as an area required to develop and submit a mitigation plan within two years of the effective date, September 30, 2016, of the final published notification to states with areas subject to mitigation requirements. On September 21, 2018, after notice and opportunity for public comment the ICAPCD submitted the High Wind Exceptional Event Fugitive Dust Mitigation Plan (Mitigation Plan) for review and verification. Subsequently, on November

28, 2018 CARB received verification from US EPA of its review and approval of the Mitigation Plan. For a copy of the Mitigation Plan visit the Imperial County Air Pollution Control District website at
https://www.co.imperial.ca.us/AirPollution/otherpdfs/MitigationPlan.pdf

The Imperial County Mitigation Plan contains important geographical and meteorological descriptions, pages 3 through 6, of the areas within Imperial County and the surrounding areas that are sources of transported fugitive dust. **Figure 1-1** helps depict the geological aspects that are within Imperial County and outside of Imperial County that affect air quality.

Essentially, the Anza-Borrego Desert State Park, which lies in a unique geologic setting along the western margin of the Salton Trough, extends north from the Gulf of California (Baja California) to the San Gorgonio Pass and from the eastern rim of the Peninsular Ranges eastward to the San Andreas Fault zone along the far side of the Coachella Valley. These areas are sources of transported fugitive dust emissions into Imperial County when westerly winds funnel through the unique landforms causing in some cases wind tunnels that cause increase in wind speeds.

During the monsoonal season, natural open desert areas to the east, southeast, and south of Imperial County are sources of transported fugitive dust emissions when thunderstorms cause outflows to blow winds across natural opens desert areas within Arizona and Mexico.

FIGURE 1-1
IMPERIAL COUNTY

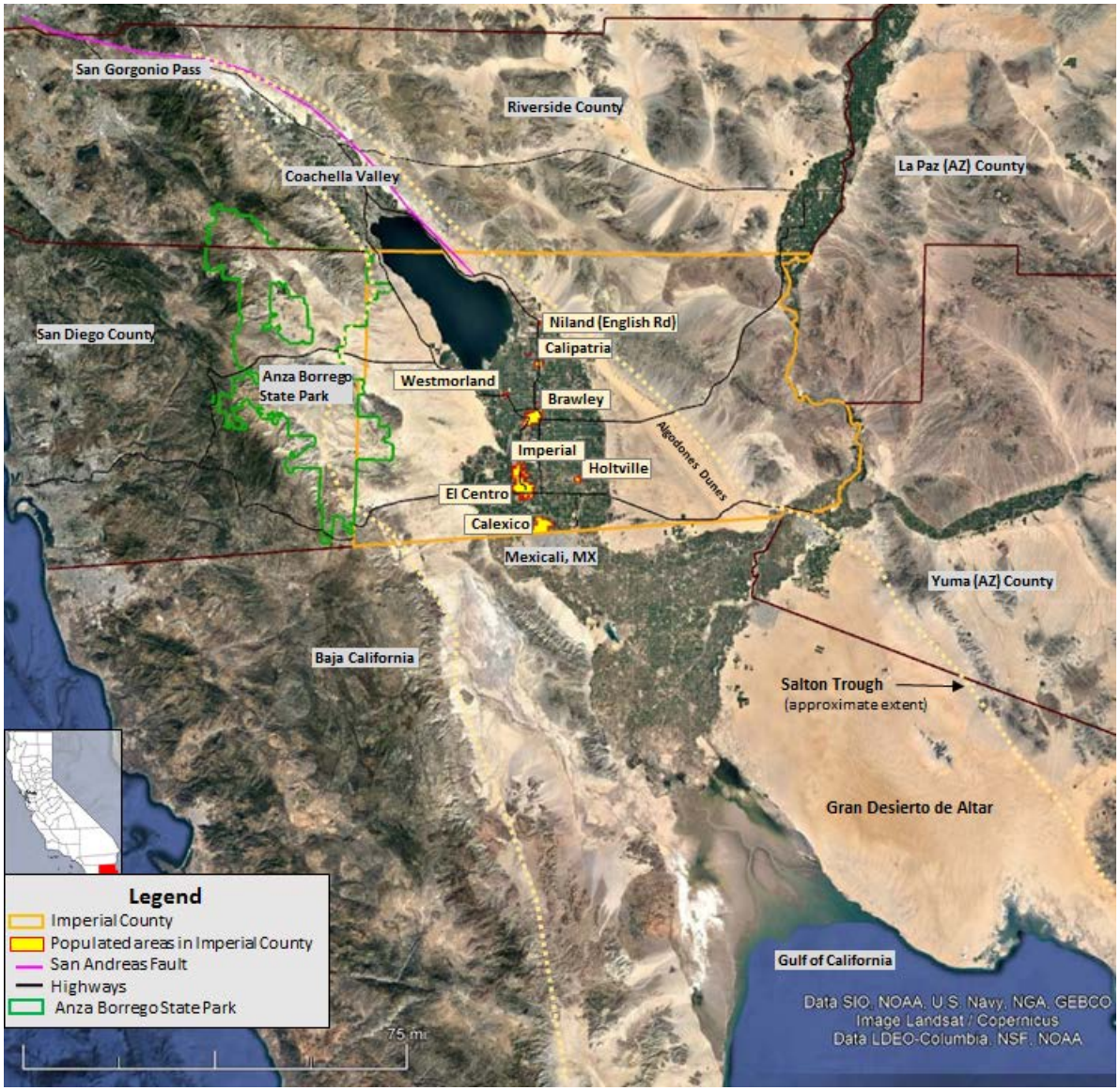


Fig 1-1: Imperial County a Southern California border region, within far southeast California bordering Arizona and Mexico has a small economically diverse region with a population of 174,528

Likewise, the Mitigation Plan contains a high wind event meteorological analysis broken down into four types of seasonal natural occurrences that cause elevated particulate matter that affects Imperial, San Diego, Riverside and Yuma Counties. The historical analysis has defined the meteorological events that lead to high winds and elevated PM_{10} events in Imperial County, page 7, as follows:

- **Type 1:** Pacific storms and frontal passages;
- **Type 2:** Strong pressure and surface pressure gradients;
- **Type 3:** Monsoonal Gulf Surges from Mexico; thunderstorm downburst, outflow winds and gust fronts from thunderstorms
- **Type 4:** Santa Ana wind events

A complete description of these events begins on page 8 of the Mitigation Plan. While there is some overlap in discussed components between the Mitigation Plan and this demonstration such as the public notification process and the warning process, the Mitigation Plan does elaborate a little further. The Mitigation Plan discusses in detail the educational component, the notification component, the warning component and the implementation of existing mitigation measures, such as Regulation VIII.

Finally, the Mitigation Plan contains a complete description of the methods, processes and mechanisms used to minimize the public exposure, page 14, retain historical and real-time data, page 15, and the consultation process with other air quality managers to abate and minimize air impacts within Imperial County, page 16.

In all, the Mitigation Plan helps explain the recurring events, by type and influence upon Imperial County and provides supporting justification of a natural event.[3]

[3] Title 40 Code of Federal Regulations §50.1 (k) defines a Natural Event as meaning an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.

FIGURE 1-2
MONITORING SITES IN AND AROUND IMPERIAL COUNTY

Fig 1-2: Depicts a select group of PM_{10} monitoring sites in Imperial County, eastern Riverside County, and southwestern Arizona (Yuma County). Generated through Google Earth

II Conceptual Model – A narrative that describes the event causing the exceedance and a discussion of how emissions from the event led to the exceedance at the affected monitors

II.1 Description of the event causing the exceedance

Days before and during Thursday, April 19, 2018 the National Weather Service (NWS) offices in Phoenix and San Diego issued Area Forecast Discussions describing an upper level trough of low pressure (deep storm system), near the northern California coast would move south and through California by Thursday, April 19, 2018.[4] The forecasters discussed the effects of this new trough as reminiscent of a similar trough days earlier however according to the Phoenix NWS office, a slower-moving system.[5] The San Diego office offered the best description of the event during its evening discussion on Tuesday, April 17, 2018.

> "…The calm before the next storm…All eyes then turn to the west as we watch a deep trough off the Oregon coast this evening move south and be near SFO Wednesday evening. The onshore gradients ahead of this system tighten up Wednesday afternoon in response to a deepening 1008 mb surface low over Nevada…The deep upper trough will race across SoCal Thursday morning…As with the Monday system, the main issue with this system will be the gusty west winds Thursday, strongest in the mountains and deserts…MOS guidance for the deserts show a burst of very strong winds into the Coachella Valley and the Lower Deserts in the afternoon. The winds may not be as widespread as they were on Monday, but they will be quite strong where they do surface…. Any scattered showers along and ahead of the cold front Thursday morning will end by Noon in most areas, perhaps lingering into the early afternoon in the southern San Diego County. Sharply colder air fills in quickly behind the cold front and snow will fall to 4500-5000 feet Thursday morning…"[6]

In any event, the slow deep storm system was expected to bring a few light showers, cold weather, snow and gusty westerly winds. As a result, the NWS offices issued a combined nine (9) Urgent Weather Messages, advising of advisory level gusty westerly winds beginning the evening of Wednesday, April 18, 2018 through Thursday, April 19, 2018. Finally, both NWS offices published "Public Information Statements" identifying the areas that measured the strongest winds.[7] **Appendix A** contains all pertinent NWS notices.

[4] National Weather Service, Area Forecast Discussion, Apr. 15, 2018 to Apr. 18, 2018, San Diego office, 344am; 902pm; 302am; 339am; 905am; 930pm; 310am; 958am; and 215pm
[5] National Weather Service, Area Forecast Discussion, Apr. 16, 2018 to Apr. 17, 2018, San Diego office, 945pm; 339am; and 930pm, Apr. 16, 2018, Phoenix office, 318am
[6] National Weather Service, Area Forecast Discussion, Apr. 17, 2018, San Diego office, 930pm
[7] National Weather Service, Public Information Statement, Apr. 19, 2018, Phoenix and San Diego offices, 349pm and 915pm

II.2 How emissions from the event led to an exceedance

On April 19, 2018, the air monitors in Imperial, Riverside and Yuma counties measured elevated concentrations of particulate matter when a forecasted upper level trough of low pressure moved inland from the Pacific coast over California. The strong gusty westerly winds associated with the deep storm system generated emissions from within the open mountain ranges and surrounding open natural deserts within San Diego and Imperial Counties. These windblown dust emissions were transported to all the Imperial County regional air quality monitors causing an exceedance of the PM10 NAAQS at the Brawley, Calexico, and Westmorland monitors (**Table 2-1**).

FIGURE 2-1
MONITORING AND METEOROLOGICAL SITES

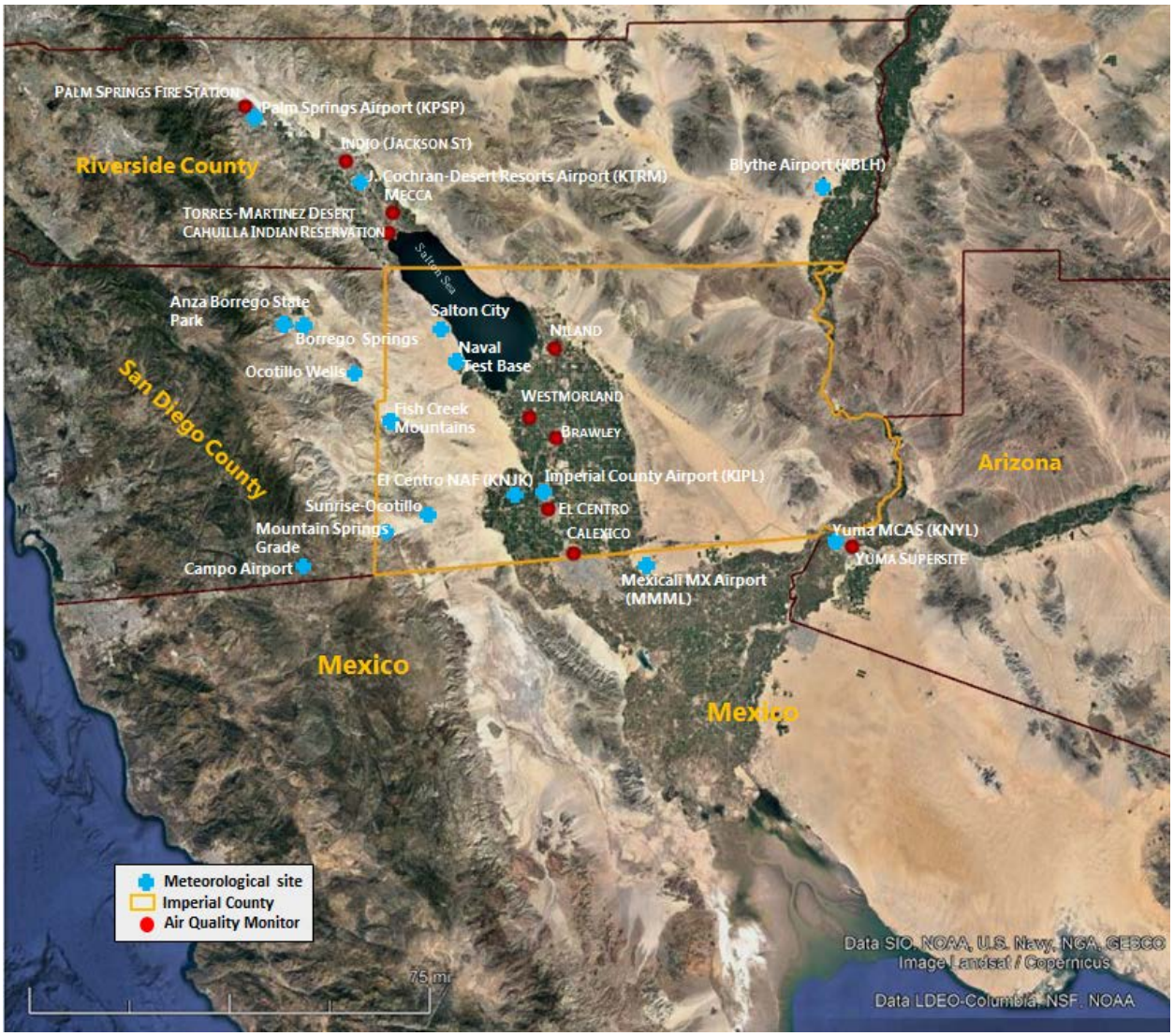


Fig 2-1: Includes a general location of the sites used in this analysis. The site furthest south is in Mexicali, Mexico and the site furthest north is the Palm Springs Fire Station

TABLE 2-1
HOURLY CONCENTRATIONS OF PARTICULATE MATTER

SITE	DATE	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Hrly MAX	24-HR AVERAGE
PALM SPRINGS FIRE STATION	20180418	13	7	11	9	11	13	25	20	11	8	9	8	10	12	13	14	32	37	31	30	27	23	21	15	37	17
	20180419	14	15	22	13	16	21	18	18	14	19	8	9	13	21	15	14	17	16	36	15	24	20	24	14	**36**	17
	20180420	14	12	12	12	11	10	13	14	12	19	16	14	12	11	5	12	28	37	50	25	25	23	20	21	50	17
INDIO	20180418	14	10	7	11	13	29	46	22	22	5	9		22	12	10	10	13	15	23	33	37	41	43	24	46	20
	20180419	23	18	15	25	20	25	28	22	23	35	88	10	8	11	45	82	50	48	70	37	23	23	18	17	**88**	31
	20180420	17	14	15	15	15	22	24	24	19	16	18	21	11	12	13	12	12	15	35	41	36	31	27	26	41	20
MECCA	20180418	30	14	11	14	41	45	74	48	6	30	18	8	29	16	24	29	12	54	25	64	10	30	47	42	74	30
	20180419	5	4	7	38	36	24	57	732	15	69	58	38	24	13	16	121	249	180	227	232	34	24	9	15	**732**	92
	20180420	21	20	15	15	18	51	34	20	8	14	18	24	13	29	41	43	21	64	11	26	51	47	32	34	64	27
TORRES-MARTINEZ TRIBAL	20180418	11	18	19	13	10	78	56	36	27	18	42	83	213	94	41	51	127	198	71	34	35	35	47	30	213	57
	20180419	29	27	26	40	76	40	583	169	22	45	32	38	13	21	29	17	129	79	116	40	20	19	23	20	**583**	68
	20180420	20	17	20	37	27	45	48	24	17	23	31	21	20	12	19	14	23	94	56	29	43	44	31	30	94	31
WESTMORLAND	20180418	15	35	77	24	44	52	86	38	27	45	27	21	16	17	30	39	47	36	66	55	128	60	195	124	195	54
	20180419	227	184	495	207	126	203	495	923	228	64	81	215	29	89	101	105	79	95	271	133	97	14	14	10	**923**	186
	20180420	14	15	25	17	20	47	52	33	22	29	28	22	20	16	12	12	16	26	25	29	47	37	35	29	52	26
BRAWLEY	20180418	26	21	17	35	31	21	37	36	26	21	9	13	12	20	27	31	32	49	82	84	50	41	44	172	172	39
	20180419	127	581	893	995	416	212	366	995	444	133	46	389	91	82	145	246	163	438	749	275	170	26	20	24	**995**	334
	20180420	11	11	11	18	15	26	35	26	28	20	27	25	14	18	16	13	13	21	35	50	47	33	28	25	50	23
NILAND	20180418	35	38	38	37	22	24	74	39		144	285	20	16	35	26	25	22	22	52	124	228	256	194	57	285	78
	20180419	157	149	75	234	199	83	276	224	152	38	47	172	177	91	208	253	193	489	250	64	67	29	16	21	**489**	152
	20180420	20	17	17	25	30	19	59	61	16	16	17	14	11	9	8	14	12	30	22	75	40	31	26	26	75	25
EL CENTRO	20180418	14	12	15	11	16	53	36	35	18	18	17	9	21	37	46	45	48	53	72	54	42	32	32	33	72	32
	20180419	35	20	73	193	697	514	410	889	348	28	18	30	52	47	61	48	19	26	31	12	28	16	15	12	**889**	150
	20180420	13	16	17	12	17	34	38	32	29	21	24	26	19	21	19	14	22	27	50	76	50	29	37	43	76	28
CALEXICO	20180418	91	35	59	36	39	85	57	56	33	20	12	25	36	40	37	38	43	52	54	53	63	34	40	26	91	44
	20180419	27	27	44	133	334	259	212	426	1294	819	32	62	117	96	68	61	72	70	49	23	26	16	13	14	**1294**	178
	20180420	16	14	16	22	25	24	34	38	31	19	24	26	27	22	19	18	19	17	61	115	120	176	115	111	176	46
YUMA AZ SUPERSITE (PST)	20180418	28	18	35	25	29	45	50	186	46	34	11	13	24	22	16	11	11	12	36	30	14	16	13	14	186	30
	20180419	28	25	20	45	371	627	321	635	735	487	265	255	267	266	164	119	139	178	119	149	70	46	42	31	**735**	225
	20180420	17	13	14	17	25	44	44	46	25	27	18	22	39	17	16	19	22	18	35	33	42	55	27	18	55	27
YUMA AZ SUPERSITE (MST)	20180418	24	28	18	35	25	29	45	50	186	46	34	11	13	24	22	16	11	11	12	36	30	14	16	13	186	31
	20180419	14	28	25	20	45	371	627	321	635	735	487	265	255	267	266	164	119	139	178	119	149	70	46	42	**735**	224
	20180420	31	17	13	14	17	25	44	44	46	25	27	18	22	39	17	16	19	22	18	35	33	42	55	27	55	27

Color coding information – **Red bold** highlighted sites indicate sites that exceeded the NAAQS. **Bold Blue** dates indicate date of Exceptional Event. **Red fill and Red bold** hourly concentrations represent concentrations above 100 µg/m^3. Pink squares around concentrations identify peak hourly concentrations

FIGURE 2-2
CONCENTRATIONS FOR ALL SITES LISTED IN TABLE 2-1

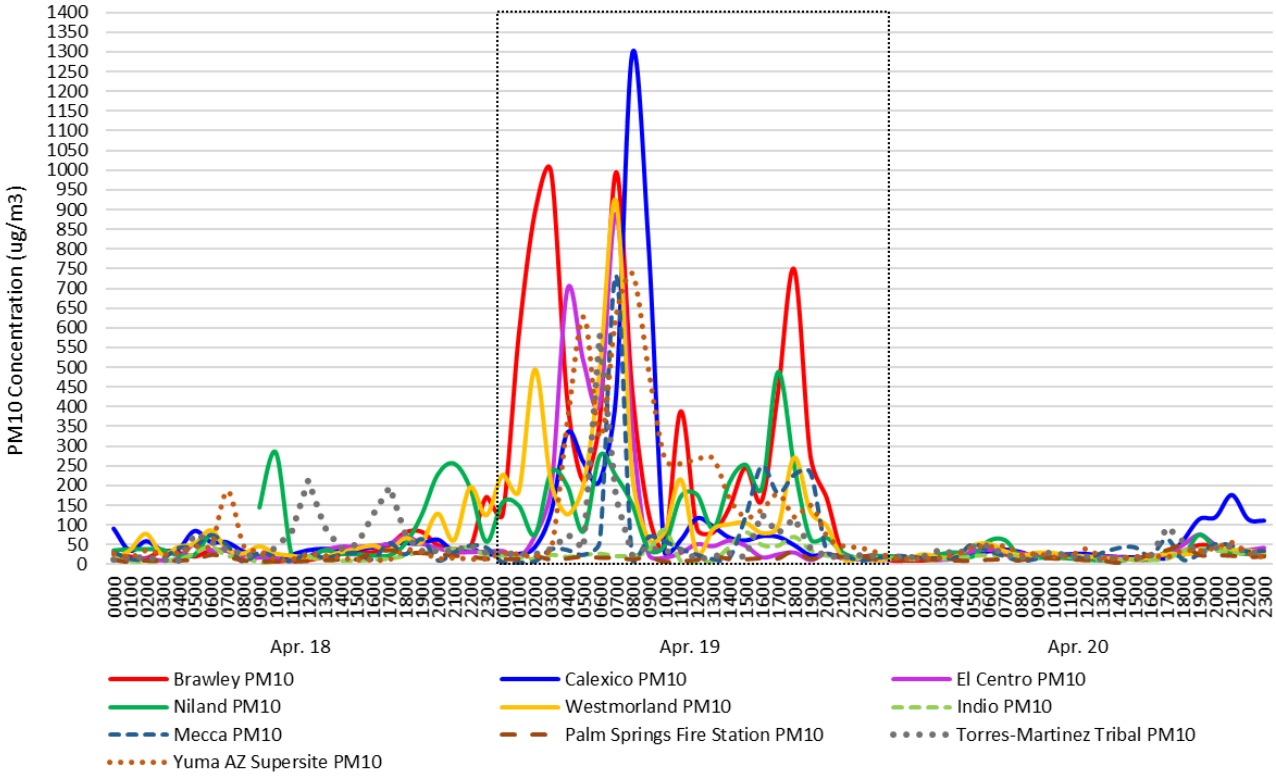


Fig 2-2: is a three-day graphical representation of the PM_{10} concentrations measured at the sites identified in **Table 2-1**. Note that nearly all of the monitors depicted, and in particular those in Imperial County, have high hourly concentrations on April 19, 2018. Concentration data from US EPA Air Quality System, https://www.epa.gov/aqs

Wind speed, wind direction and airflow patterns combined all help explain how windblown emissions resulting from the strong gusty westerly winds associated with the passing of the deep storm system affected all monitors in Imperial County on Thursday, April 19, 2018.

As mentioned above, the early weather forecast notices issued by both the San Diego and Phoenix NWS offices indicated that a deep storm system would increase the onshore pressure gradient and produce strong gusty westerly winds across southern California including southeastern California by Thursday, April 19, 2018. As mentioned above, nine (9) Urgent Weather Messages were issued by the NWS office in San Diego and Phoenix advising of advisory level westerly winds within the San Diego Mountains and Imperial County (**Appendix A**).

Figures 2-3 and 2-4 depict the compiled wind data for regional and neighboring airports and upstream sites. Airports within Imperial, Riverside, San Diego and Yuma counties measured wind speeds at or above 25 mph or measured wind gusts at or above 25 mph.

FIGURE 2-3
LOCAL AND VICINITY AIRPORT WIND SPEEDS AND GUSTS

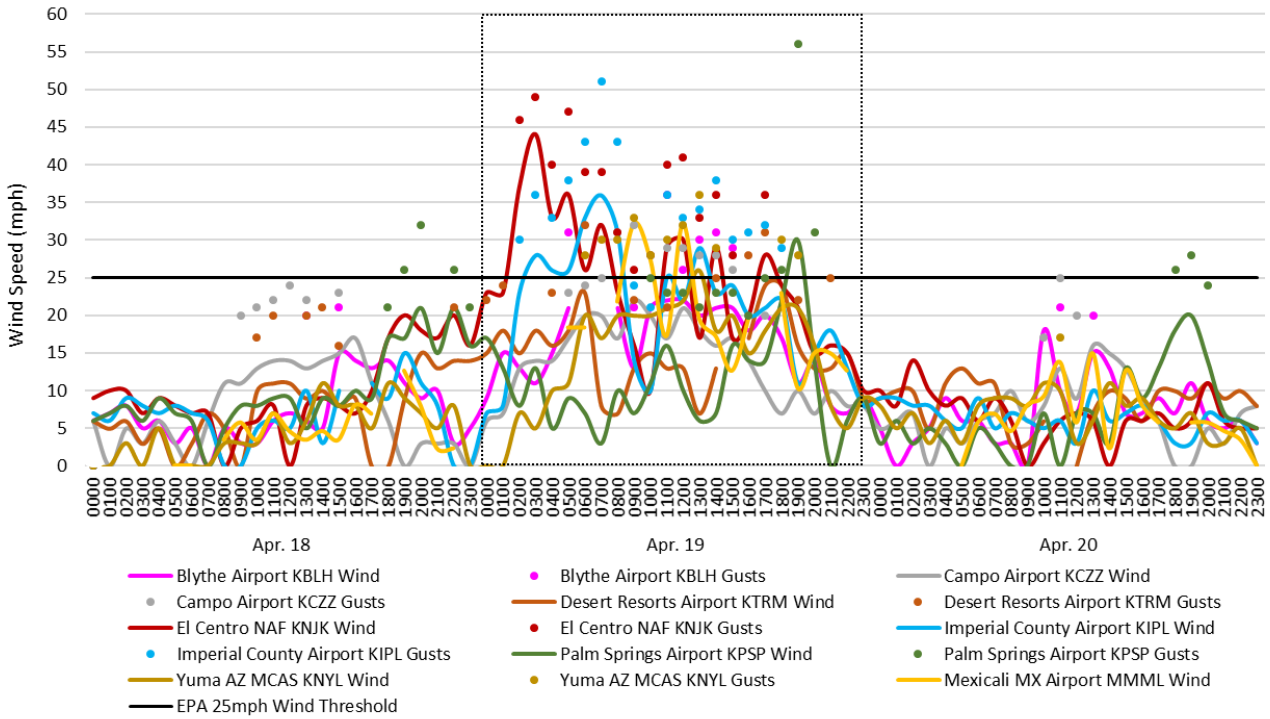


Fig 2-3: is a three-day graphical representation of the measured wind speed and wind gusts (if available) from local and neighboring airports. All data derived from the Local Climatological Data Hourly Observations (LCDHO) reports released by the NOAA https://www.ncdc.noaa.gov/. MMML is from the University of Utah's Meso West https://mesowest.utah.edu/index.html

FIGURE 2-4
WIND SPEEDS AND GUST UPSTREAM SITES

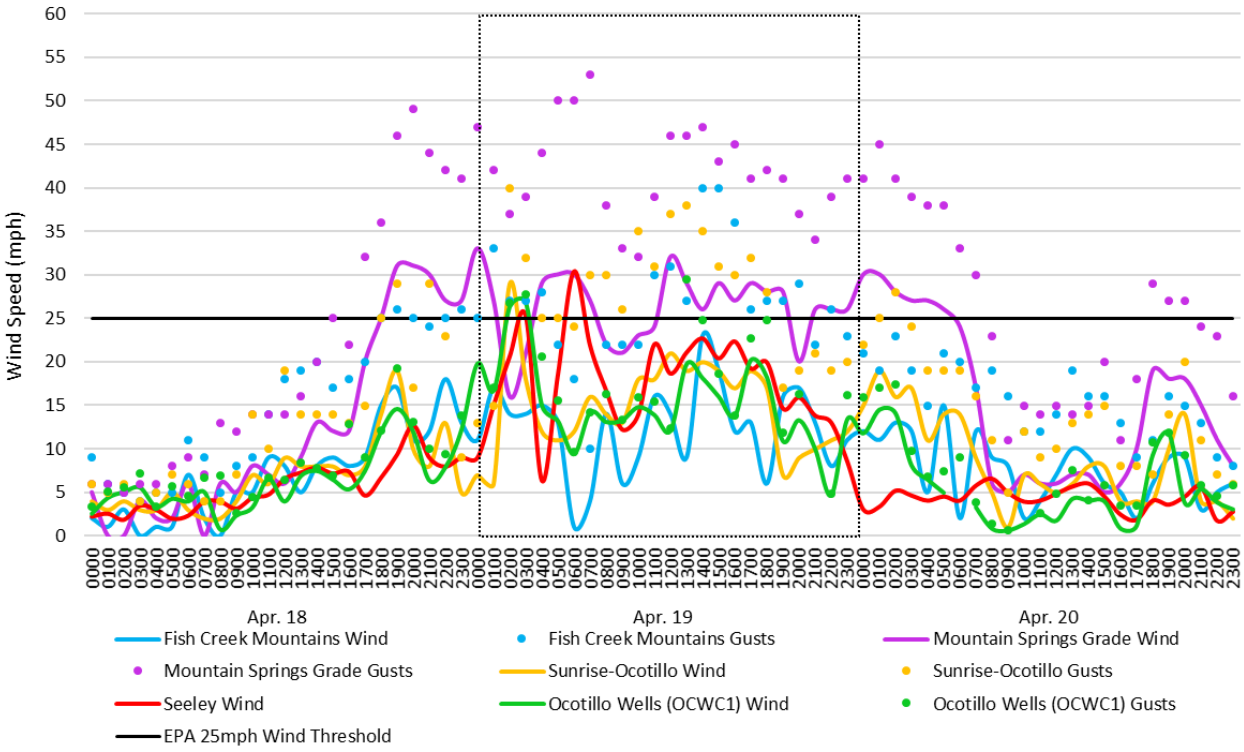


Fig 2-4: is a three-day graphical representation of the measured wind speed and wind gust (if available) from sites located upstream from the Imperial County monitors. All data derived from the University of Utah's Meso West https://mesowest.utah.edu/index.html

The National Oceanic and Atmospheric Administration (NOAA) Laboratory HYSPLIT back-trajectory models[8] provide supporting evidence of the westerly airflow within Imperial County on April 19, 2018. As an all-day event, the HYSPLIT back-trajectory models in **Figures 2-5 and 2-6** depict the airflow during the dawn hour (0000 PST) and early morning hour (0700 PST) to help illustrate the shift of airflow from a southwesterly direction, to a west direction during the hours when the air quality monitors measured the higher level concentrations.

Figure 2-5 depicts the general airflow from a southwest direction coincident with elevated concentrations above 100 µg/m^3 at the Brawley, Niland and Westmorland monitors. **Figure 2-6** depicts the general airflow from a due west direction coincident

[8] The Hybrid Single Particle Lagrangian Integrated Trajectory Model (**HYSPLIT**) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. It is currently used to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's MODIS satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology. Source: NOAA/Air Resources Laboratory, 2011.

with peak hourly measured concentrations at the Brawley, Westmorland and El Centro monitors. As the system moved further east during the late evening hours, concentrations reduced significantly at all air quality monitors in Imperial County.

FIGURE 2-5
HYSPLIT MODEL All SITES APRIL 19, 2018 0000 PST

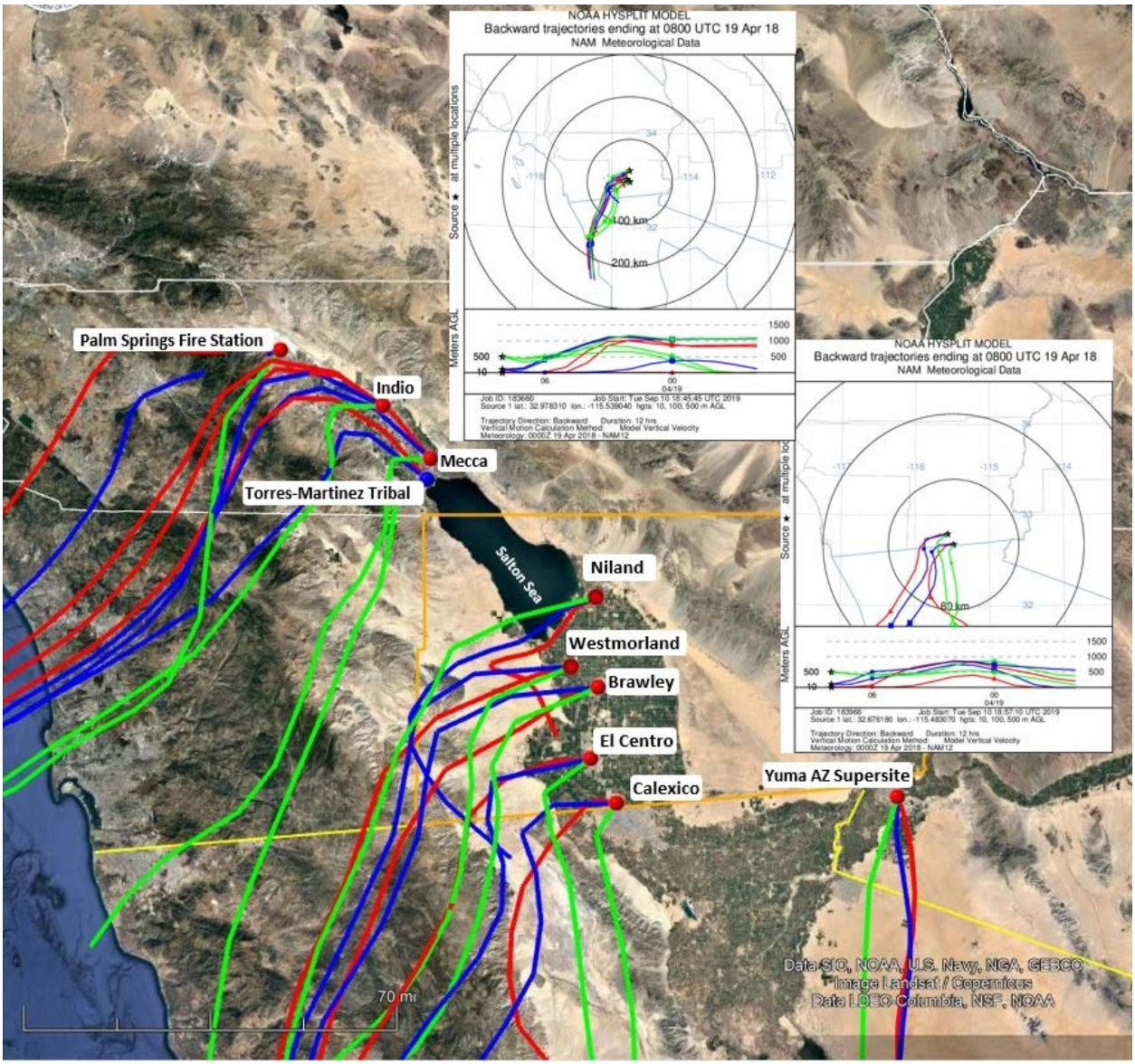


Fig 2-5: A 12-hour HYSPLIT back-trajectory ending at 0000 PST for all sites identified in **Table 2-1**. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

FIGURE 2-6
HYSPLIT MODEL All SITES APRIL 19, 2018 0700 PST

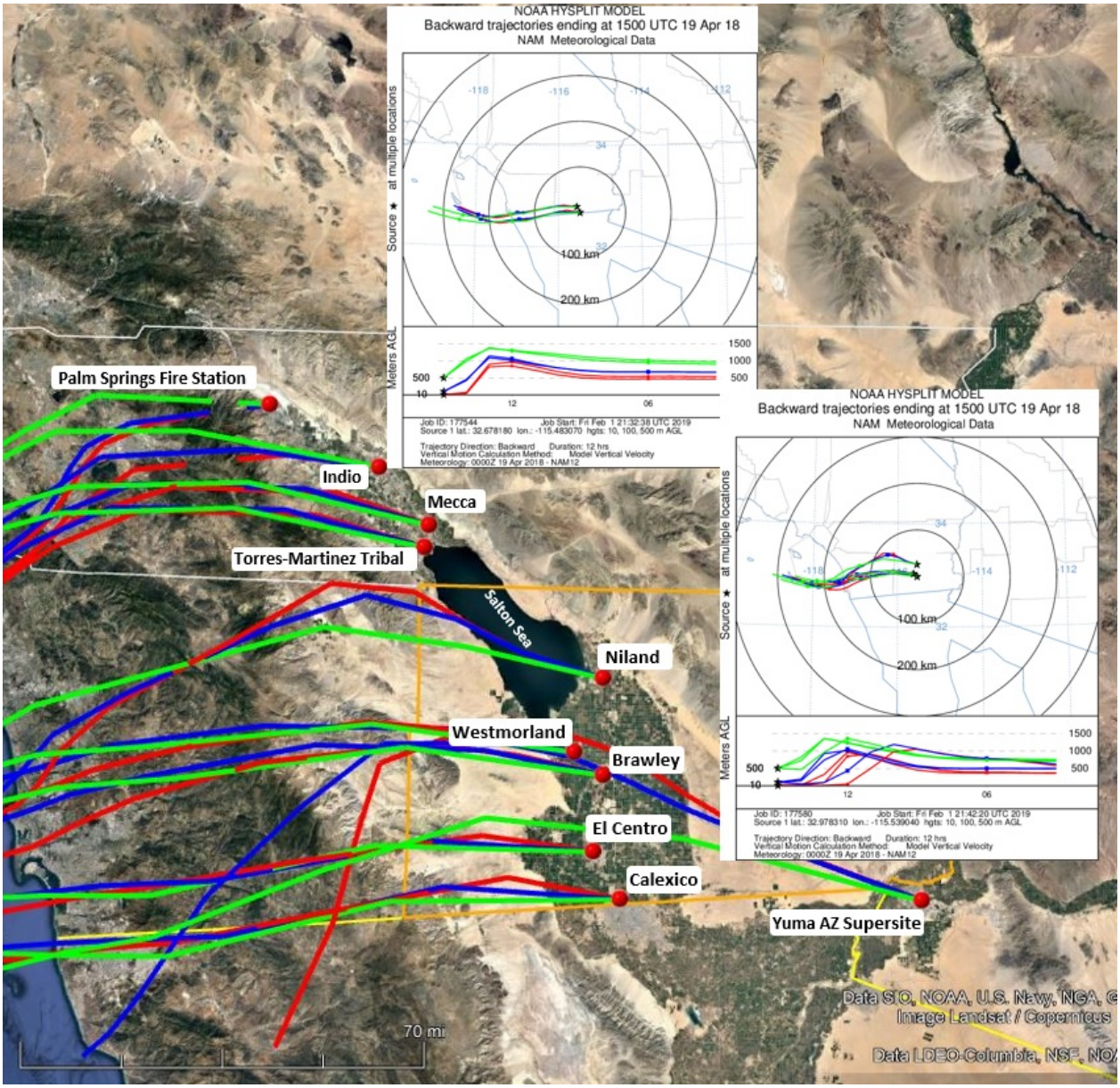


Fig 2-6: A 12-hour back-trajectory HYSPLIT ending at 0700 PST for all sites identified in **Table 2-1**. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

As strong gusty westerly winds blew over open natural desert areas southwest and west of Imperial County, fugitive windblown dust significantly affected all air quality monitors in Imperial County. The intensity of the deep storm system caused the NWS offices to issue nine (9) Urgent Weather Messages advising of advisory levels winds within the San Diego Mountains and deserts as well as in Imperial County. On April 19, 2018 the El Centro NAF (KNJK) measured 10 hours of winds at or above 25 mph with a maximum

wind speed of 44 mph and with a peak gust of 49 mph. Similarly, the Imperial County Airport (KIPL) measured eight hours of wind speeds at or above 25 mph with a maximum wind speed of 36 mph and a peak gust of 51 mph.

III Clear Causal Relationship – A demonstration that the event affected air quality illustrating the relationship between the event and the monitored exceedance

As mentioned above, an upper level trough of low pressure (deep storm system), near the northern California coast moved south and through California on Thursday, April 19, 2018.[9] Although forecasters found the effects of this new trough as reminiscent of a similar trough days earlier this system was not as widespread, rain was along the mountain crests and although winds were gusty within the deserts, significant amounts of blowing dust were not evident on satellite. Here it is important to note the precipitation amounts within the San Diego Mountains would have allowed for less transport of fugitive emissions into Imperial County allowing for less deposition of particulates onto air quality monitors. In any event, the event was best described by the NWS's San Diego office in its evening discussion on April 19, 2018.

> "…At 130 PM, an upper level trough was centered over Nevada, with cool northwest flow from the surface to 500mb over SoCal. Rain showers had ended over the region, with 0.01-0.05 inches of accumulation from the mountain crests westward. Winds remained gusty in the deserts, through significant blowing dust was not evident on satellite. Gusty winds will continue through tonight as mountain wave activity mixes 30-45 kt 850-700 mb winds down to the surface. The strongest winds are expected in the San Diego County deserts where the core of an 850-700 mb jet will be perpendicular to the terrain. Winds speeds should be limited to isolated 60 mph gust along the desert slopes, and 35-50 mph gusts on the desert floor. Diminishing winds late tonight as mountain wave activity and mid level support shift east along with the upper trough."[10]

As a summary, the slow deep storm system brought a few light showers, cold weather and gusty westerly winds. As indicated earlier the NWS offices published "Public Information Statements" identifying the areas that measured the strongest winds.[11]

While elevated wind speeds play a significant and important role in the transportation of dust, gusts and precipitation play an equally significant role in deposition of particulates onto a monitor and the overall affect onto ambient air.[12] As winds and gusts increased on April 19, 2018 windblown dust from outlaying open deserts entered Imperial County and degraded air quality. As mentioned in Section I.1 above, the ICAPCD issued an

[9] National Weather Service, Area Forecast Discussion, Apr. 15, 2018 to Apr. 18, 2018, San Diego office, 344am PDT; 902pm PDT; 302am PDT; 339am PDT; 905am PDT; 930pm PDT; 310am PDT; 958am PDT; and 215pm PDT

[10] National Weather Service, Area Forecast Discussion, Apr. 19, 2018, San Diego office, 201pm PDT

[11] National Weather Service, Public Information Statement, Apr. 19, 2018, Phoenix and San Diego offices, 349pm PDT and 915pm PDT

[12] Gust is a rapid fluctuation of wind speed with variations of 10 knots or more between peaks and lulls; National Weather Service Glossary https://w1.weather.gov/glossary/index.php?letter=g

advisory of the potential for elevated particulate matter and the potential of degradation of air quality to a moderate or unhealthy level.

Figure 3-1 below provides an illustration of some of the meteorological conditions as described above and demonstrated in the HYSPLITS, for April 19, 2018, which affected air quality in Imperial County causing an exceedance at Brawley, Westmorland and Calexico monitors. As windblown dust emissions, generated within the natural open mountains within San Diego blew into and over natural open deserts within Imperil County air quality was affected by a significant amount of dust.

FIGURE 3-1
VISUAL RAMP-UP ANALYSIS AS DISCUSSED FOR APRIL 19, 2018

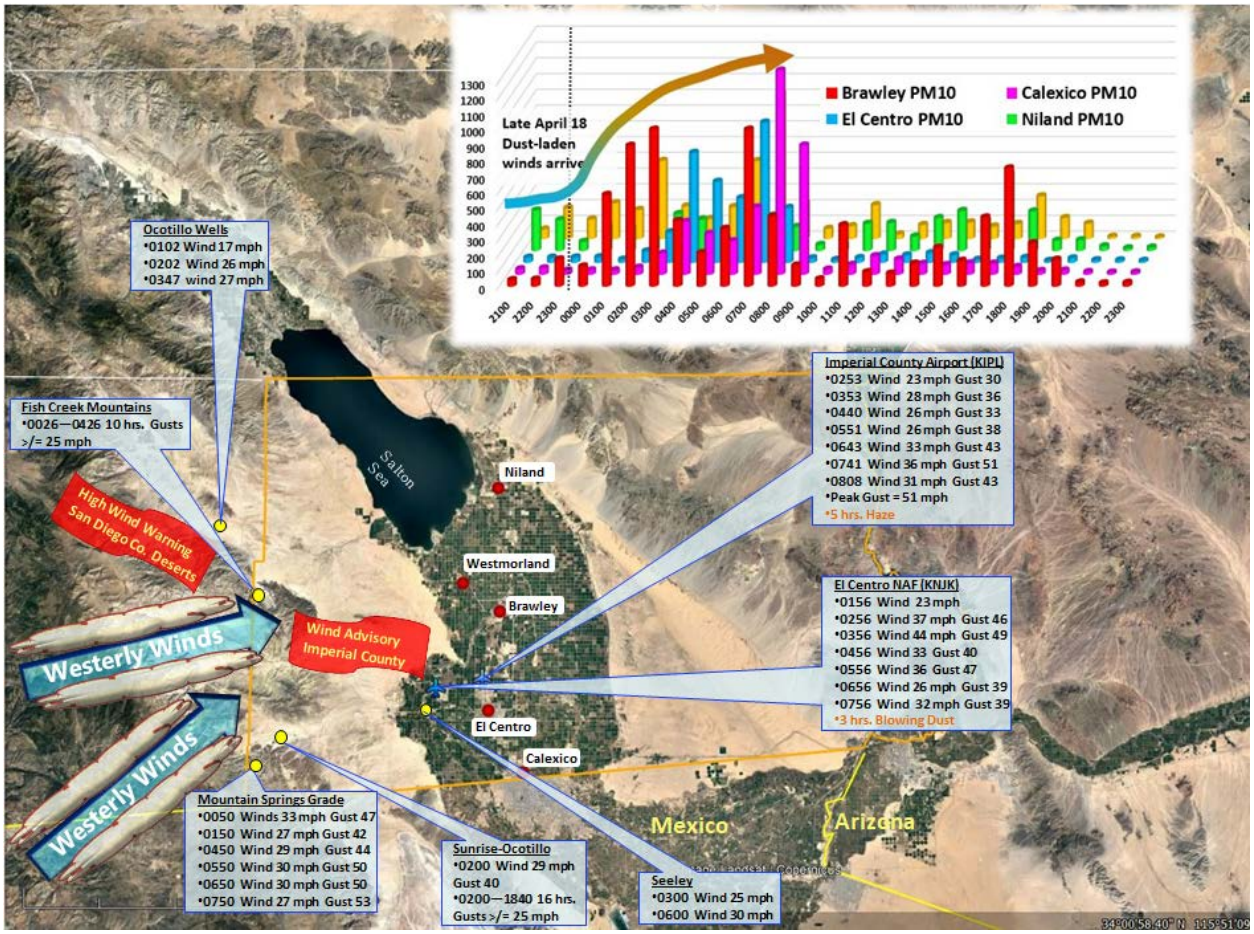


Fig 3-1: On April 19, 2018, a slow deep storm system moved over the region and increased the onshore surface pressure gradient, creating strong gusty westerly winds. Windblown dust arrived late on April 18, 2018 and increased through April 19, 2018 ultimately causing an exceedance of the PM_{10} NAAQS at the Brawley, Calexico, and Westmorland monitors. Google Earth base map

An indicator of air quality can be discerned from the level of visibility at any given time and day. While the ICAPCD air monitoring stations do not measure levels of visibility the

local and surrounding airports do so. The El Centro NAF (KNJK) and the Imperial County Airport (KIPL) both reported reduced visibility shortly after midnight on April 19, 2018 coincident with elevated concentrations at the air quality monitors. **Figure 3-2** and **Tables 3-1 and 3-2** provide information regarding the reduced visibility in Imperial County and the relation to hourly concentrations at local air monitors.

While **Figure 3-2** is a graphical representation of the reduced visibility within Imperial County and surrounding areas, **Tables 3-1 and 3-2** provide a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM_{10} concentrations at the Brawley, Calexico, and Westmorland monitors. Together, the data provides the supporting relationship between the elevated winds, blowing dust and reduced visibility.

According to the compiled information found in **Figure 3-2,** visibility reduced at the two major airports, the El Centro NAF (KNJL) and the Imperial County Airport (KIPL) throughout the day on April 19, 2018 coincident with elevated hourly concentrations at the air quality monitors in Imperial County.

FIGURE 3-2
72-HOUR TIME SERIES PM_{10} CONCENTRATIONS AND VISIBILITY

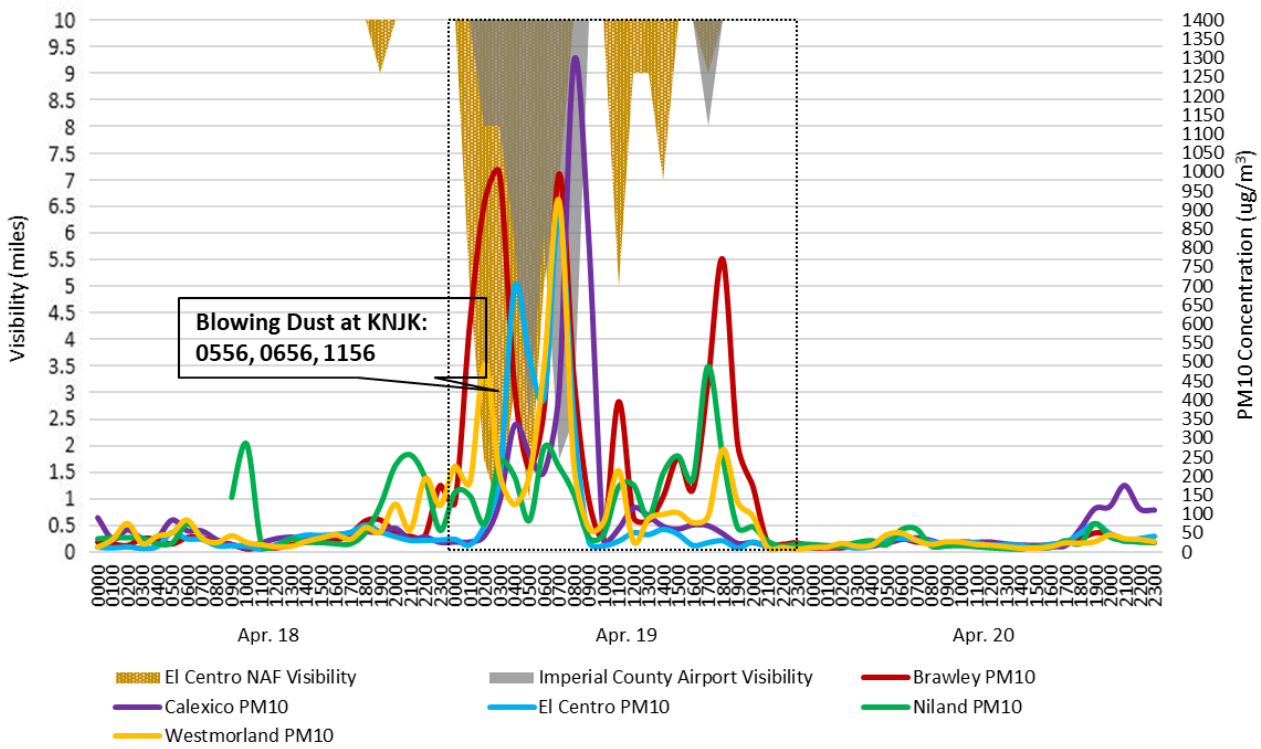


Fig 3-2: is a graphical representation of the compiled data from the Imperial County Airport (KIPL), and the El Centro NAF (KNJK). Reported reduced visibility is coincident with elevated winds and hourly levels of concentrations either just prior to peak concentrations or after. Visibility data from the NCEI's QCLCD data bank https://www.ncdc.noaa.gov/

Because the EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states[13] the **Tables 3-1 and 3-2** are provided in support of the relationship between the elevated winds and elevated concentrations. In each table the measured elevated concentrations of PM_{10} either follow or occur during periods of elevated winds or gusts. Each table has a select group of meteorological sites that compare the hourly winds with the closest measured hourly concentration at each of the exceeding monitors, with a final table comparing select meteorological sites with all monitors.

[13] "Treatment of Data Influenced by Exceptional Events; Final Guidance", FR Vol. 81, No. 191, 68279, October 3, 2016

TABLE 3-1
WIND SPEEDS AND PM_{10} CONCENTRATIONS *APRIL 19, 2018

	IMPERIAL COUNTY AIRPORT (KIPL)			MOUNTAIN SPRINGS GRADE (TNSC1)			SUNRISE-OCOTILL0 (IMPSD)			OCOTILLO WELLS (OCWC1)			FISH CREEK MOUNTAINS (FHCC1)			SEELEY (CI068)		EL CENTRO NAF (KNJK)				NLND	EC
HOUR	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/D	W/S	W/G	W/D	OBS.	PM_{10} (ug/m^3)	
2100	8		280	30	44	216	8	29	222	6	10	314	12	24	210	9	297	17		260		256	32
2200	0		0	27	42	214	13	23	211	8	9	349	18	25	219	8	307	20		260		194	32
2300	0		0	27	41	213	5	9	89	12	14	303	13	26	205	9	298	16		260		57	33
000	7		320	33	47	205	7	13	59	20			11	25	196	9	283	23		250		157	35
100	8		290	27	42	208	6	15	262	17	17	286	17	33	203	15	282	23		270		149	20
200	23	30	260	16	37	221	29	40	247	26	27		14	27	201	21	286	37	46	260		75	73
300	28	36	270	21	39	229	18	32	253	27	28	280	14	27	209	25	282	44	49	250		234	193
400	26	33	240	29	44	236	12	25	260	15	21	286	15	28	210	6	255	33	40	270		199	697
500	26	38	270	30	50	245	11	25	259	13	16	257	13	22	240	19	267	36	47	260	BLDU	83	514
600	33	43	270	30	50	241	12	24	264	9	10	280	1	18	41	30	268	26	39	260	BLDU	276	410
700	36	51	260	27	53	246	16	30	276	14	14	246	4	10	356	22	268	32	39	250		224	889
800	31	43	260	22	38	241	14	30	263	13	16	269	14	22	284	17	271	23	31	240		152	348
900	14	24	250	21	33	243	13	26	264	13	13	309	6	22	217	12	280	16	26	250		38	28
1000	10	21	290	23	32	237	18	35	267	15	16	280	9	22	280	14	278	10		250		47	18
1100	25	36	260	24	39	244	18	31	271	14	15	246	16	30	282	22	271	29	40	250	BLDU	172	30
1200	22	33	240	32	46	236	21	37	264	12	12	229	14	31	304	19	266	30	41	240		177	52
1300	29	34	250	29	46	234	19	38	261	20	29	229	9	27	255	21	266	17	33	280		91	47
1400	23	38	260	26	47	241	20	35	268	18	25	286	23	40	248	23	269	29	36	240		208	61
1500	24	30	250	29	43	236	19	31	272	16	19	217	19	40	249	20	278	17	28	280		253	48
1600	20	31	290	27	45	234	17	30	266	14	14	280	12	36	263	22	276	20		280		193	19
1700	21	32	270	29	41	233	19	32	273	20	23	234	13	26	325	19	290	28	36	260		489	26
1800	22	29	250	28	42	227	17	28	269	18	25	229	6	27	9	20	275	24		250		250	31
1900	11		260	28	41	212	7	17	270	11	12	251	16	27	244	15	270	21		260		64	12
2000	15		280	20	37	227	9	19	265	13	16	286	17	29	236	16	285	15		260		67	28
2100	18		270	26	34	207	10	21	257	10			13	22	227	14	280	16		250		29	16
2200	13		280	26	39	205	11	19	251	5	5	234	8	26	253	13	288	15		260		16	15
2300	8		230	26	41	208	12	20	253	13	16	280	11	23	202	9	280	10		260		21	12

*Blue dates reference April 18, 2018. Wind data for KIPL and KNJK from the NCEI's QCLCD system. Wind data for Mountain Springs Grade (TNSC1), Seeley (CI068), Sunrise-Ocotillo (IMPSD), Fish Creek Mountains (FHCC1) and Ocotillo Wells (OWOC1) from the University of Utah's MesoWest system https://mesowest.utah.edu/index.html. Wind speeds = mph; Direction = degrees. **BLDU** = blowing dust. Due to the different times that wind data and air quality data is sampled at various sites, the hour given represents the hour in which the measurement was taken

TABLE 3-2
WIND SPEEDS AND PM_{10} CONCENTRATIONS *APRIL 19, 2018

	IMPERIAL COUNTY AIRPORT (KIPL)			MOUNTAIN SPRINGS GRADE (TNSC1)			SUNRISE-OCOTILL0 (IMPSD)			OCOTILLO WELLS (OCWC1)			FISH CREEK MOUNTAINS (FHCC1)			SEELEY (CI068)		EL CENTRO NAF (KNJK)				WSTMLD	BRLY	CX
HOUR	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/D	W/S	W/G	W/D	OBS.	PM_{10} (ug/m^3)		
2100	8		280	30	44	216	8	29	222	6	10	314	12	24	210	9	297	17		260		60	41	34
2200	0		0	27	42	214	13	23	211	8	9	349	18	25	219	8	307	20		260		195	44	40
2300	0		0	27	41	213	5	9	89	12	14	303	13	26	205	9	298	16		260		124	172	26
000	7		320	33	47	205	7	13	59	20			11	25	196	9	283	23		250		227	127	27
100	8		290	27	42	208	6	15	262	17	17	286	17	33	203	15	282	23		270		184	581	27
200	23	30	260	16	37	221	29	40	247	26	27		14	27	201	21	286	37	46	260		495	893	44
300	28	36	270	21	39	229	18	32	253	27	28	280	14	27	209	25	282	44	49	250		207	995	133
400	26	33	240	29	44	236	12	25	260	15	21	286	15	28	210	6	255	33	40	270		126	416	334
500	26	38	270	30	50	245	11	25	259	13	16	257	13	22	240	19	267	36	47	260	BLDU	203	212	259
600	33	43	270	30	50	241	12	24	264	9	10	280	1	18	41	30	268	26	39	260	BLDU	495	366	212
700	36	51	260	27	53	246	16	30	276	14	14	246	4	10	356	22	268	32	39	250		923	995	426
800	31	43	260	22	38	241	14	30	263	13	16	269	14	22	284	17	271	23	31	240		228	444	1294
900	14	24	250	21	33	243	13	26	264	13	13	309	6	22	217	12	280	16	26	250		64	133	819
1000	10	21	290	23	32	237	18	35	267	15	16	280	9	22	280	14	278	10		250		81	46	32
1100	25	36	260	24	39	244	18	31	271	14	15	246	16	30	282	22	271	29	40	250	BLDU	215	389	62
1200	22	33	240	32	46	236	21	37	264	12	12	229	14	31	304	19	266	30	41	240		29	91	117
1300	29	34	250	29	46	234	19	38	261	20	29	229	9	27	255	21	266	17	33	280		89	82	96
1400	23	38	260	26	47	241	20	35	268	18	25	286	23	40	248	23	269	29	36	240		101	145	68
1500	24	30	250	29	43	236	19	31	272	16	19	217	19	40	249	20	278	17	28	280		105	246	61
1600	20	31	290	27	45	234	17	30	266	14	14	280	12	36	263	22	276	20		280		79	163	72
1700	21	32	270	29	41	233	19	32	273	20	23	234	13	26	325	19	290	28	36	260		95	438	70
1800	22	29	250	28	42	227	17	28	269	18	25	229	6	27	9	20	275	24		250		271	749	49
1900	11		260	28	41	212	7	17	270	11	12	251	16	27	244	15	270	21		260		133	275	23
2000	15		280	20	37	227	9	19	265	13	16	286	17	29	236	16	285	15		260		97	170	26
2100	18		270	26	34	207	10	21	257	10			13	22	227	14	280	16		250		14	26	16
2200	13		280	26	39	205	11	19	251	5	5	234	8	26	253	13	288	15		260		14	20	13
2300	8		230	26	41	208	12	20	253	13	16	280	11	23	202	9	280	10		260		10	24	14

*Blue dates reference April 18, 2018. Wind data for KIPL and KNJK from the NCEI's QCLCD system. Wind data for Mountain Springs Grade (TNSC1), Seeley (CI068), Sunrise-Ocotillo (IMPSD), Fish Creek Mountains (FHCC1) and Ocotillo Wells (OWOC1) from the University of Utah's MesoWest system https://mesowest.utah.edu/index.html. Wind speeds = mph; Direction = degrees. **BLDU** = blowing dust. Due to the different times that wind data and air quality data is sampled at various sites, the hour given represents the hour in which the measurement was taken

As mentioned above, Area Forecast Discussions or Urgent Weather Messages containing a Wind Advisory and/or a Blowing Dust Advisory described the gusty westerly winds for the region extending from the San Diego Mountains and deserts, Imperial County and western Arizona. The slow deep storm system produced gusty westerly winds that affected different regional air monitors in Riverside, Imperial and Yuma counties (**Table 2-1**).

The ICAPCD monitors air quality for each of its stations and issues web-based Air Quality Indices in response to changes in air quality.[14] As transported windblown dust entered Imperial County on April 19, 2018, the air quality in the Imperial County degraded to unhealthy levels. Overall, the strong westerly winds associated with the slow deep storm system affected air quality in Imperial County.

FIGURE 3-3
IMPERIAL VALLEY AIR QUALITY INDEX FOR BRAWLEY
APRIL 19, 2018

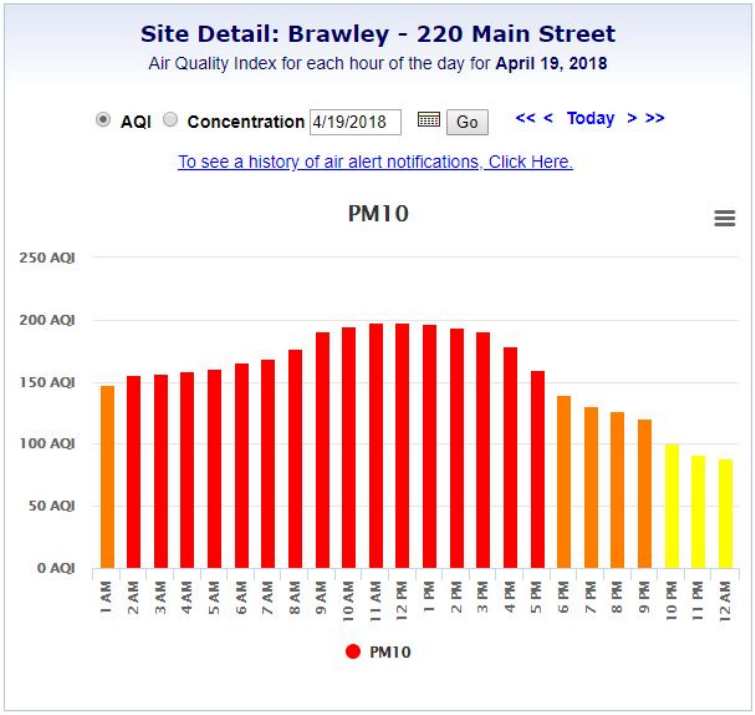


Fig 3-3: The degradation, or affect upon air quality, maybe determined when the AQI changes to a "Red" level or Unhealthy level

[14] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health affects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: https://airnow.gov/index.cfm?action=aqibasics.aqi

FIGURE 3-4
IMPERIAL VALLEY AIR QUALITY INDEX FOR CALEXICO
APRIL 19, 2018

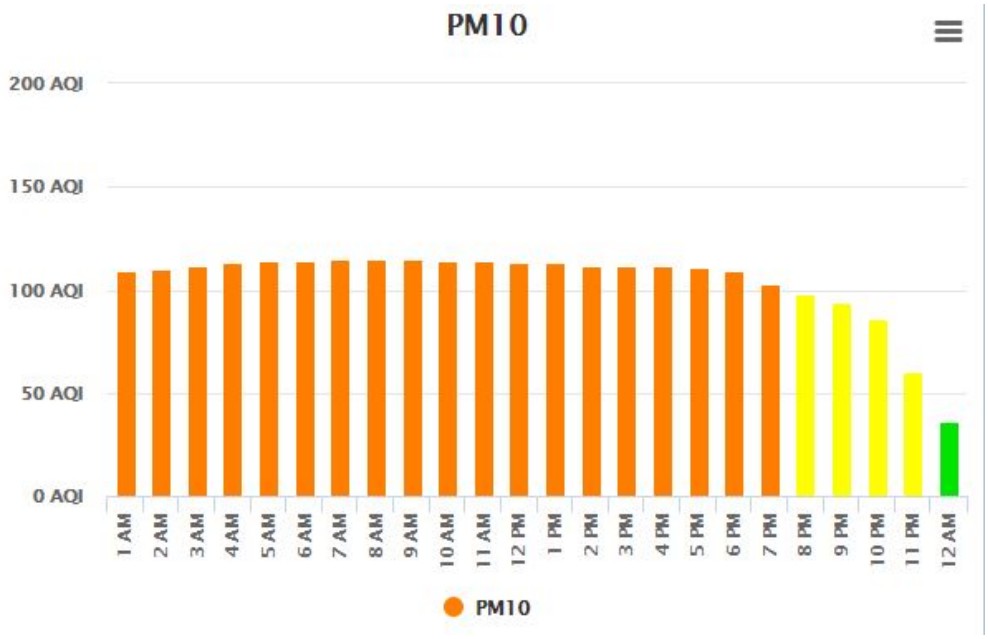


Fig 3-4: The degradation, or affect upon air quality, maybe determined when the AQI changes to an "Orange" or Unhealthy for Sensitive Groups

FIGURE 3-5
IMPERIAL VALLEY AIR QUALITY INDEX FOR WESTMORLAND
APRIL 19, 2018

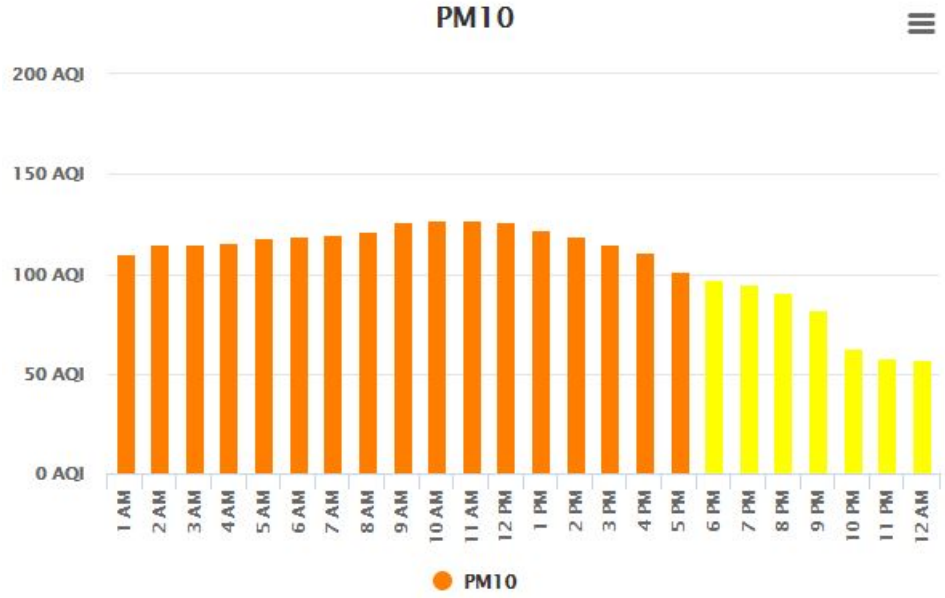


Fig 3-5: The degradation, or affect upon air quality, maybe determined when the AQI changes to an "Orange" or Unhealthy for Sensitive Groups

III.1 Summary of Forecasts and Warnings

Days before and during Thursday, April 19, 2018 the National Weather Service (NWS) offices in Phoenix and San Diego issued Area Forecast Discussions describing an upper level trough of low pressure (deep storm system), near the northern California coast would move south and through California by Thursday, April 19, 2018.[15] The forecasters discussed the effects of this new trough as reminiscent of a similar trough days earlier however according to the Phoenix NWS office, a slower-moving system.[16]

Therefore, the NWS offices issued a combined nine (9) Urgent Weather Messages, advising of advisory level gusty westerly winds beginning the evening of Wednesday, April 18, 2018 through Thursday, April 19, 2018. Finally, both NWS offices published "Public Information Statements" identifying the areas that measured the strongest winds.[17] **Appendix A** contains all pertinent NWS notices.

III.2 Summary of Wind Observations

As demonstrated above wind data during the event were available from airports in eastern Riverside County, southeastern San Diego County, southwestern Yuma County (Arizona), northern Mexico, and Imperial County as well as from other automated meteorological instruments upwind from the monitors. Data analysis indicates that on April 19, 2018 different sites measured wind speeds at or above (and some far in excess of) 25 mph.

[15] National Weather Service, Area Forecast Discussion, Apr. 15, 2018 to Apr. 18, 2018, San Diego office, 344am; 902pm; 302am; 339am; 905am; 930pm; 310am; 958am; and 215pm

[16] National Weather Service, Area Forecast Discussion, Apr. 16, 2018 to Apr. 17, 2018, San Diego office, 945pm; 339am; and 930pm, Apr. 16, 2018, Phoenix office, 318am

[17] National Weather Service, Public Information Statement, Apr. 19, 2018, Phoenix and San Diego offices, 349pm and 915pm

IV Concentration to Concentration Analysis – An analyses comparing the event-influenced concentrations to concentrations at the same monitoring site at other times

While naturally occurring high wind events may recur seasonally and at times frequently and qualify for exclusion under the EER, historical comparisons of the particulate concentrations and associated winds provide insight into the frequency of events within an identified area.

Figures 4-1 through 4-6 show the time series of available FRM and BAM 24-hr PM_{10} concentrations at the Brawley, Westmorland and Calexico monitors for the period of January 1, 2010 through April 19, 2018. The compiled data set below includes non-regulatory data prior to 2013. As a consequence, continuous monitoring data (hourly concentrations) prior to 2013 were not reported into the US EPA Air Quality System (AQS).[18] The difference between the standard and local condition concentrations is not significant enough to change the outcome of the analysis.

Compiled and plotted 24-hour averaged PM_{10} concentrations, between January 1, 2010 and April 19, 2018, as measured by the Brawley, Westmorland and Calexico monitors, were used to establish the historical and seasonal variability over time.[19] All figures illustrate that the exceedance, which occurred on April 19, 2018, was outside the normal historical concentrations when compared to event and non-event days. Air quality data for all graphs obtained through the EPA's AQS data bank.

[18] Pollutant concentration data contained in EPA's Air Quality System (AQS) are required to be reported in units corrected to standard temperature and pressure (25 C, 760 mm Hg). Because the PM_{10} concentrations prior to 2013 were not reported into the AQS database all BAM (FEM) data prior to 2013 within this report are expressed as micrograms per cubic meter (mg/m^3) at local temperature and pressure (LTP) as opposed to standard temperature and pressure (STP 760torr and 25C). The difference in concentration measurements between standard conditions and local conditions is insignificant and does not alter or cause any significant changes in conclusions to comparisons of PM_{10} concentrations to PM_{10} concentrations with in this demonstration.

[19] FRM sampling ended December 2016.

FIGURE 4-1
BRAWLEY HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO APRIL 19, 2018

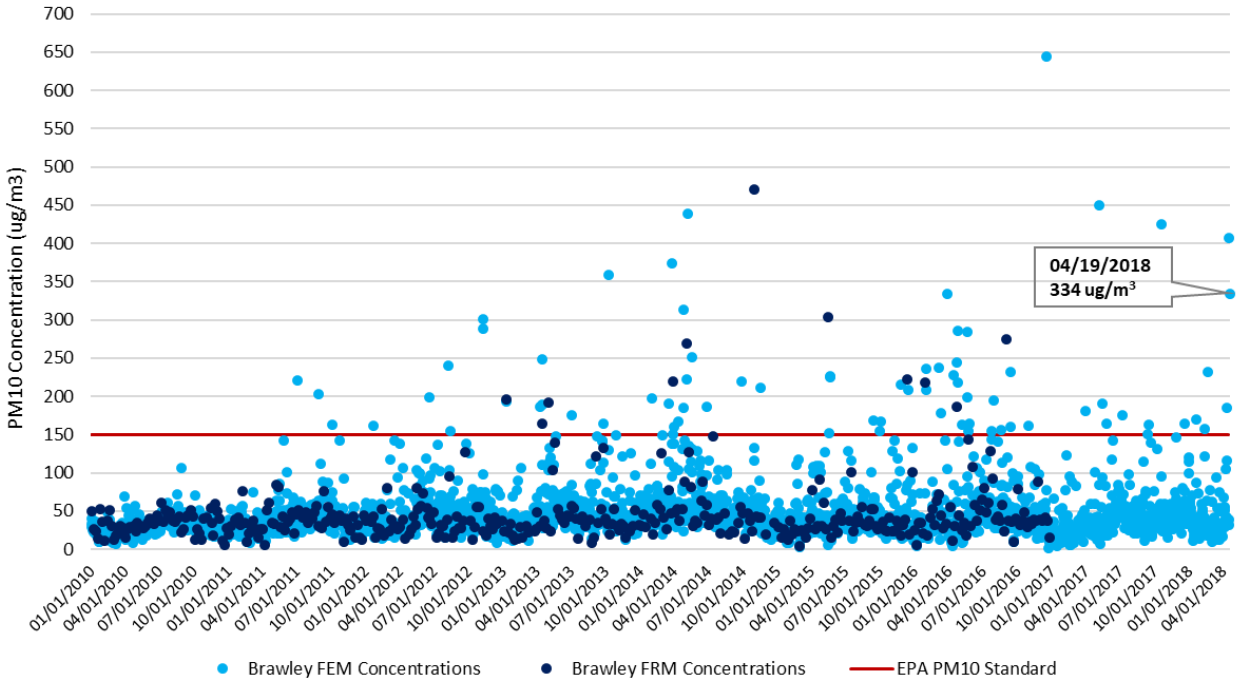


Fig 4-1: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 334 µg/m^3 on April 19, 2018 by the Brawley monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-1,** for Brawley includes 3,031 sampling days (January 1, 2010 through April 19, 2018). Of the 3,031 sampling days the Brawley monitor measured 73 exceedance days which translates into an occurrence rate less than 2.5%. Historically, there were fourteen (14) exceedance days measured during the first quarter; thirty (30) exceedance days measured during the second quarter; sixteen (16) exceedance days measured during the third quarter; and thirteen (13) exceedance days measured during the fourth quarter.

FIGURE 4-2
CALEXICO HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO APRIL 19, 2018

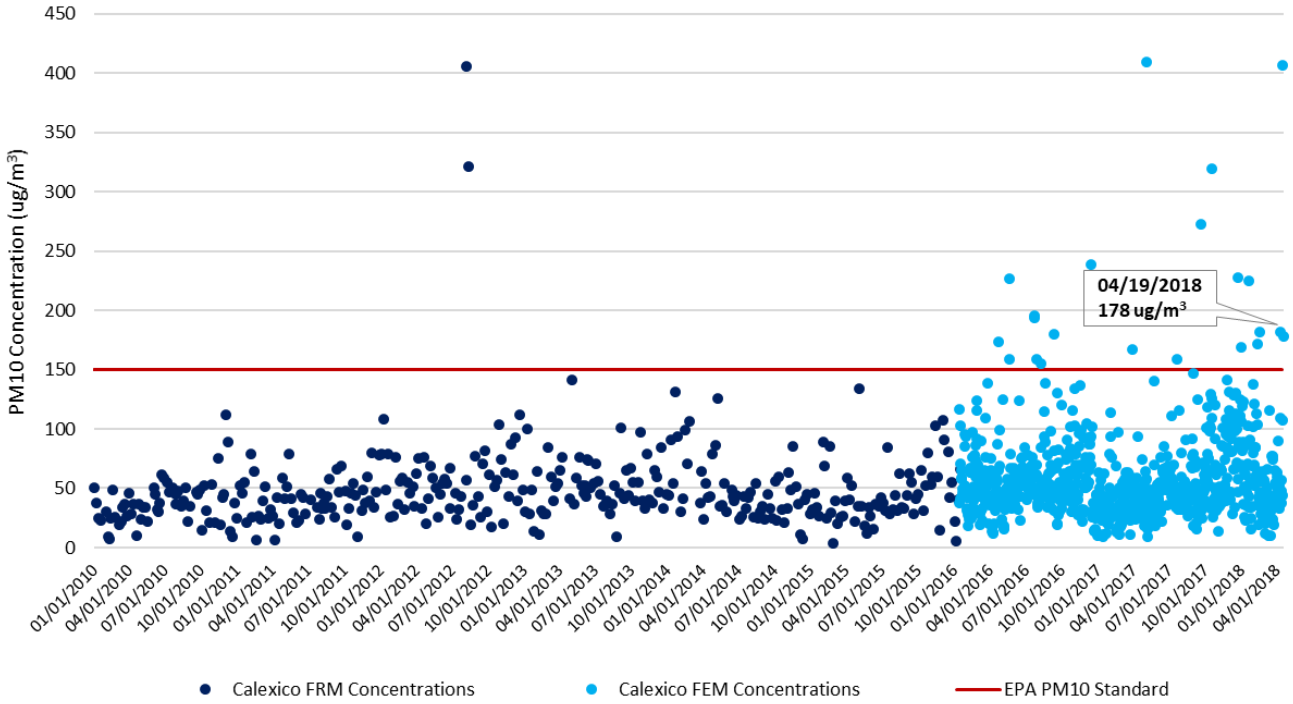


Fig 4-2: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 178 µg/m^3 on April 19, 2018 by the Calexico monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-2,** for Calexico includes 1,242 sampling days (January 1, 2010 through April 19, 2018). Of the 1,242 sampling days the Calexico monitor measured 24 exceedance days which translates into an occurrence rate less than 2%. Historically, there were five (5) exceedance days measured during the first quarter; seven (7) exceedance days were measured during the second quarter; nine (9) exceedance days were measured during the third quarter; and three (3) exceedance days were measured during the fourth quarter.

FIGURE 4-3
WESTMORLAND HISTORICAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO APRIL 19, 2018

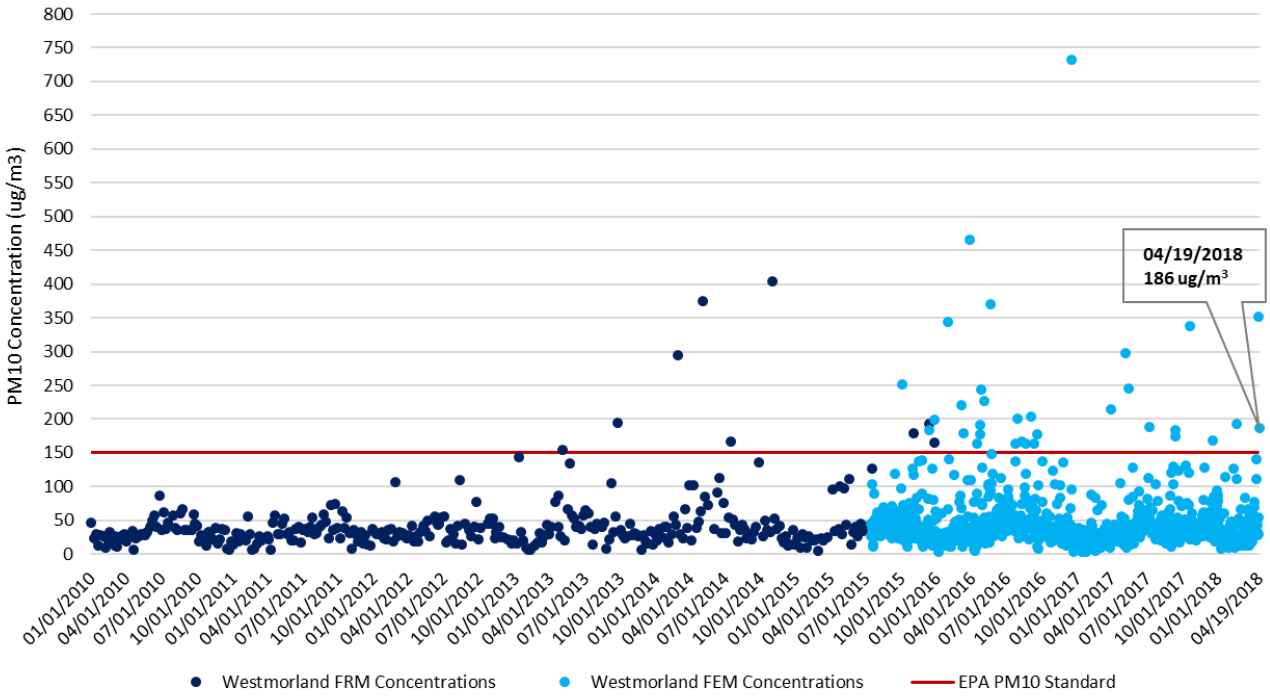
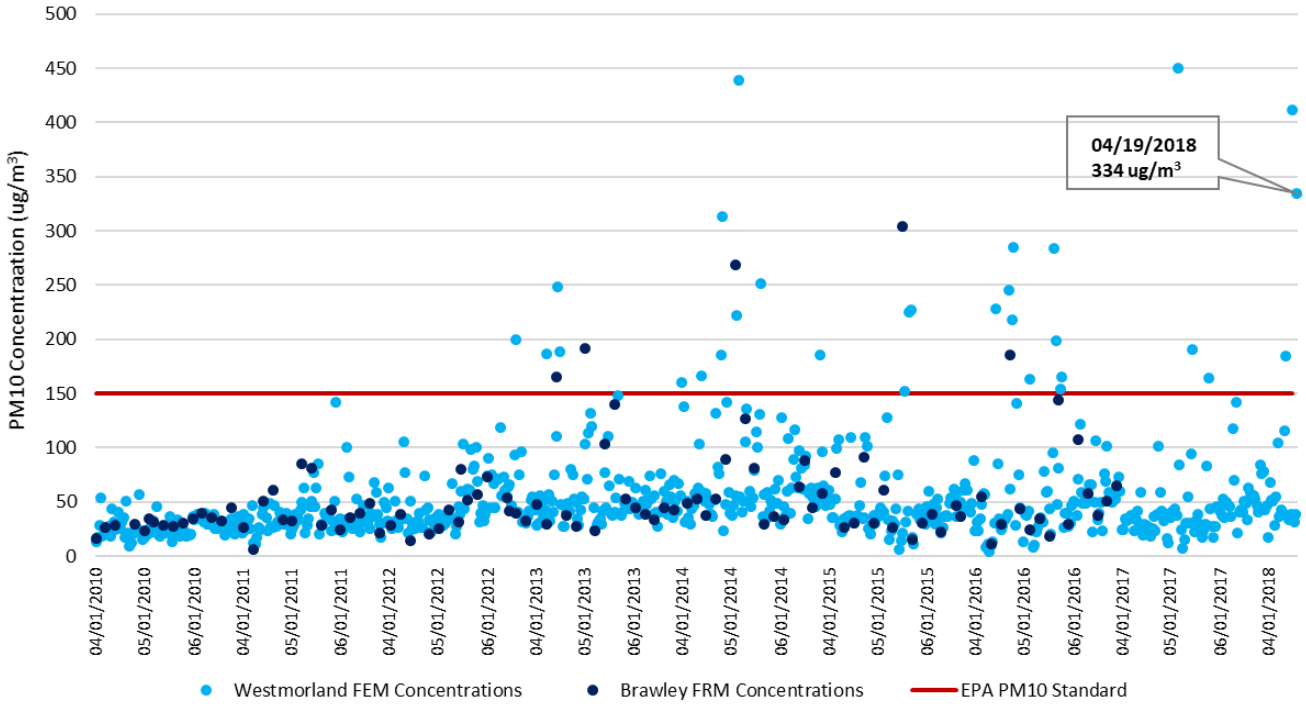


Fig 4-3: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 186 µg/m^3 on April 19, 2018 by the Westmorland monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-3,** for Westmorland includes 1,360 sampling days (January 1, 2010 through April 19, 2018). Of the 1,360 sampling days the Westmorland monitor measured 39 exceedance days which translates into an occurrence rate less than 3%. Historically, there were seven (7) exceedance days measured during the first quarter; twelve (12) exceedance days measured during the second quarter; twelve (12) exceedance days measured during the third quarter; and eight (8) exceedance days measured during the fourth quarter.

FIGURE 4-4
BRAWLEY SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***APRIL 1, 2010 TO APRIL 19, 2018**

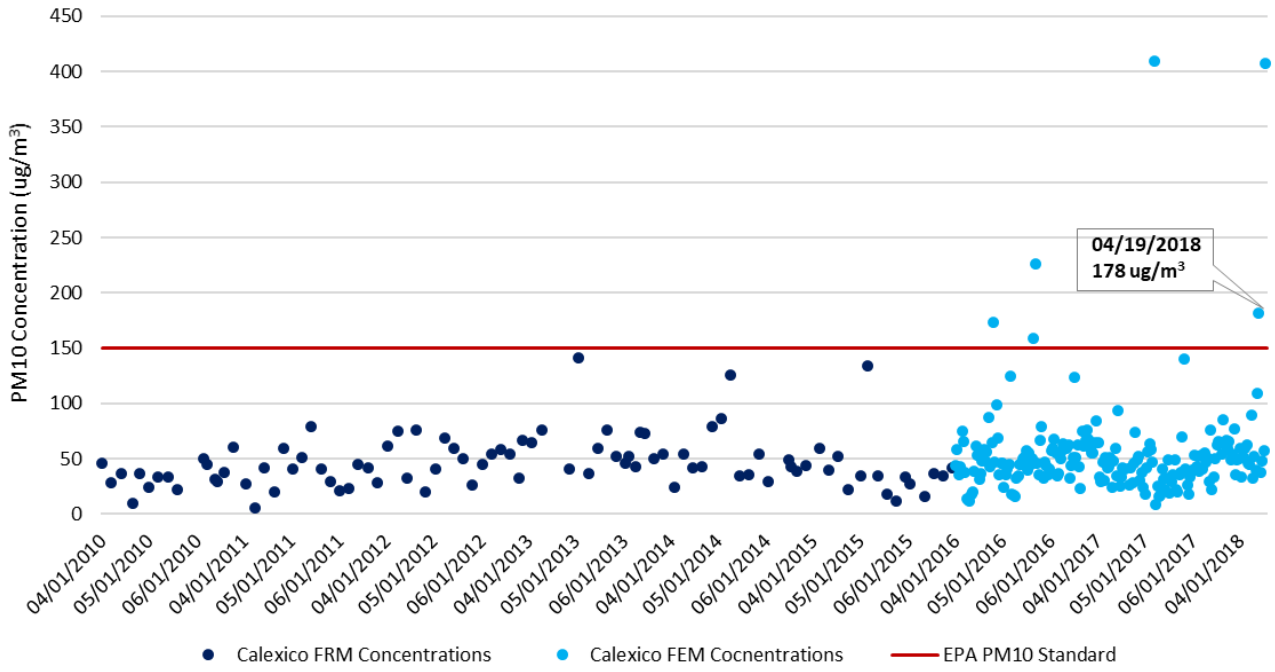


***Quarterly: April 1, 2010 to June 30, 2017 and April 1, 2018 to April 19, 2018**

Fig 4-4: A comparison of PM_{10} seasonal concentrations demonstrate that the measured concentration of 434 µg/m^3 by the Brawley monitor on April 19, 2018 was outside the normal seasonal concentrations when compared to similar days and non-event days

Figure 4-4 illustrates the seasonal fluctuations over a period of 747 sampling days, 850 credible samples and thirty (30) exceedance days. This translates to less than a 3.5% seasonal exceedance occurrence rate.

FIGURE 4-5
CALEXICO SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***APRIL 1, 2010 TO APRIL 19, 2018**

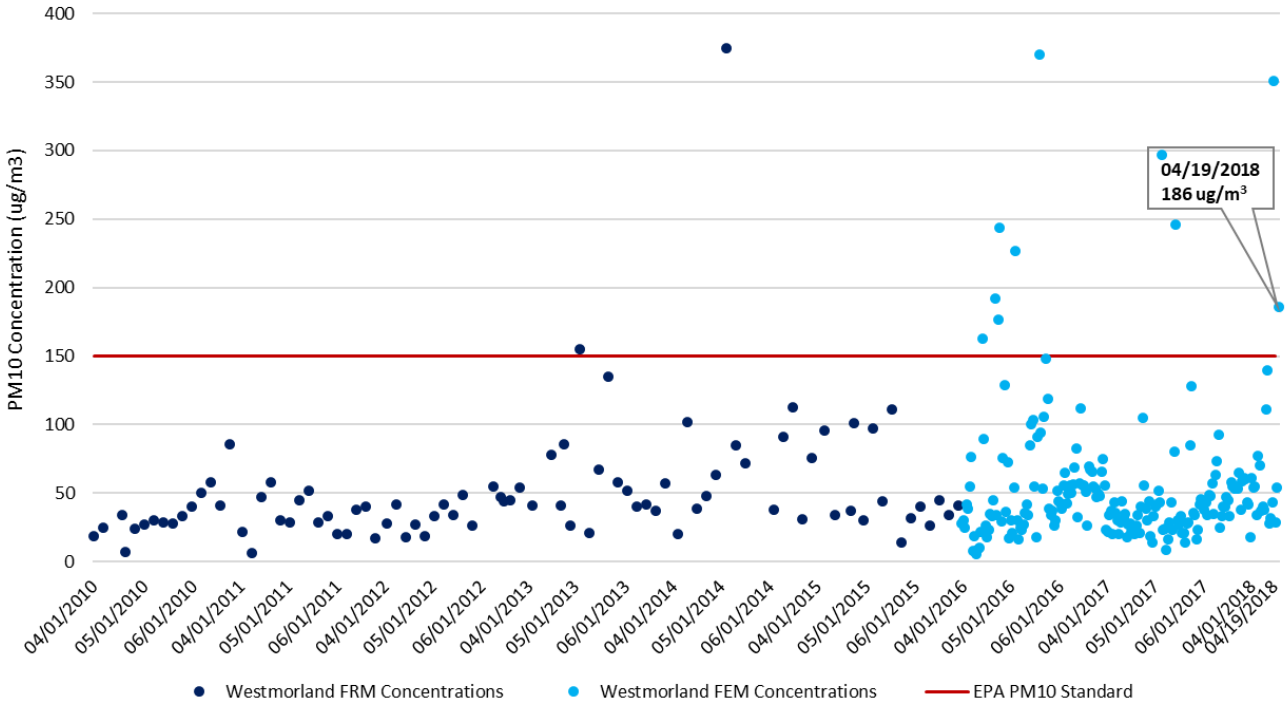


***Quarterly: April 1, 2010 to June 30, 2017 and April 1, 2018 to April 19, 2018**

Fig 4-5: A comparison of PM_{10} seasonal concentrations demonstrate that the measured concentration of 178 µg/m³ by the Calexico monitor on April 19, 2018 was outside the normal seasonal concentrations when compared to similar days and non-event days

Figure 4-5 illustrates the seasonal fluctuations over a period of 304 sampling days, 291 credible samples and seven (7) exceedance days. This translates to less than a 2.4% seasonal exceedance occurrence rate.

FIGURE 4-6
WESTMORLAND SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***APRIL 1, 2010 TO APRIL 19, 2018**



***Quarterly: April 1, 2010 to June 30, 2017 and April 1, 2018 to April 19, 2018**

Fig 4-6: A comparison of PM_{10} seasonal concentrations demonstrate that the measured concentration of 186 µg/m^3 by the Westmorland monitor on April 19, 2018 was outside the normal seasonal concentrations when compared to similar days and non-event days

Figure 4-6 illustrates the seasonal fluctuations over a period of 296 sampling days, 289 credible samples and twelve (12) exceedance days. This translates to less than a 4.1% seasonal exceedance occurrence rate.

Examining the historical and seasonal time series concentrations as they relate to the April 19, 2018 measured exceedances, the exceedances measured on April 19, 2018 are clearly outside the normal concentration levels when comparing to similar event days and non-event days.

V Both Not Reasonably Controllable and Not Reasonably Preventable – A demonstration that the event was both not reasonably controllable and not reasonably preventable

The analysis above, under the Clear Causal Relationship, indicates that the primary sources affecting air quality in Imperial County originated within the natural open areas of the San Diego Mountains and the natural open deserts to the west and southwest of Imperial County, including those desert areas in Mexico. The origination of these emissions from these areas affected all the air quality monitors on April 19, 2018. Since Imperial County does not have jurisdiction over emissions emanating from San Diego or Mexico it is not reasonably controllable or preventable by Imperial County. For a brief description of the controls implemented by sources beyond the control of Imperial County see section V.1 below.

As mentioned above in section I.4, Mitigation of Exceptional Events contains significant information regarding the application of Best Available Control Measures that are used as measures to abate or minimize contributing controllable sources of identified pollutants (**Page 12, sub-section II.2 of the High Wind Mitigation Plan**). In addition, the mitigation plan explains the methods utilized to minimize public exposure to high concentrations of identified pollutants, the process utilized to collect and maintain data pertinent to any identified event, and the mechanisms utilized to consult with other air quality managers within the affected area regarding the appropriate responses to abate and minimize affects.

Inhalable particulate matter (PM_{10}) contributes to effects that are harmful to human health and the environment, including premature mortality, aggravation of respiratory and cardiovascular disease, decreased lung function, visibility impairment, and damage to vegetation and ecosystems. Upon enactment of the 1990 Clean Air Act (CAA) amendments, Imperial County was classified as moderate nonattainment for the PM_{10} NAAQS under CAA sections 107(d)(4)(B) and 188(a). By November 15, 1991, such areas were required to develop and submit State Implementation Plan (SIP) revisions providing for, among other things, implementation of reasonably available control measures (RACM).

Partly to address the RACM requirement, ICAPCD adopted local Regulation VIII rules to control PM_{10} from sources of fugitive dust on October 10, 1994, and revised them on November 25, 1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.

On August 11, 2004, USEPA reclassified Imperial County as a serious nonattainment area for PM_{10}. As a result, CAA section 189(b)(1)(B) required all BACM to be implemented in the area within four years of the effective date of the reclassification, i.e., by September 10, 2008.

On November 8, 2005, partly to address the BACM requirement, ICAPCD revised the Regulation VIII rules to strengthen fugitive dust requirements. On July 8, 2010, USEPA finalized a limited approval of the 2005 version of Regulation VIII, finding that the seven Regulation VIII rules largely fulfilled the relevant CAA requirements. Simultaneously, USEPA also finalized a limited disapproval of several of the rules, identifying specific deficiencies that needed to be addressed to fully demonstrate compliance with CAA requirements regarding BACM and enforceability.

In September 2010, ICAPCD and the California Department of Parks and Recreation (DPR) filed petitions with the Ninth Circuit Federal Court of Appeals for review of USEPA's limited disapproval of the rules. After hearing oral argument on February 15, 2012, the Ninth Circuit directed the parties to consider mediation before rendering a decision on the litigation. On July 27, 2012, ICAPCD, DPR and USEPA reached agreement on a resolution to the dispute, which included a set of specific revisions to Regulation VIII. The October 16, 2012 adopted revision reflects the specific revisions to Regulation VIII, which USEPA approved on April 22, 2013. Since 2006, ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County.

FIGURE 5-1
REGULATION VIII GRAPHIC TIMELINE DEVELOPMENT

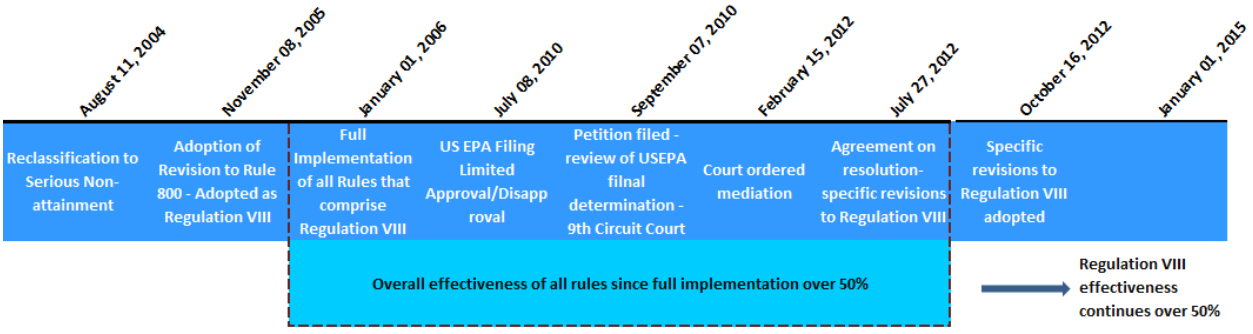


Fig 5-1: Regulation VIII Graphic Timeline

V.1 Other PM_{10} Control Measures

In addition to the rules and regulations listed above, other PM_{10} control measures have been committed to, and implemented by, local California air districts bordering ICAPCD. San Diego County (to the west of Imperial County) and eastern Riverside County (outside

of the Coachella Valley Planning Area and to the north and northeast of Imperial County) are both designated unclassified for the PM_{10} NAAQS and are not required to have BACM controls for PM_{10}. The Coachella Valley Planning Area in Riverside County, to the north and northwest of Imperial County, is designated a PM_{10} nonattainment area, and a redesignation request and maintenance plan were submitted to USEPA in 2010. These three areas and their relevant PM_{10} rules are indicated in **Tables 5-1 to 5-3**.

TABLE 5-1
SAN DIEGO AIR POLLUTION CONTROL DISTRICT (SDAPCD)

RULES REGULATING EXISTING AND NEW NON-POINT SOURCES IN SAN DIEGO COUNTY	
RULE NUMBER AND TITLE	DESCRIPTION
Rule 52 – Particulate Matter	Limits the amount of particulate matter that may be discharged from any source.
Rule 52.1 – NSPS and NESHAPS Particulate Matter Requirements	Ensures that sources subject to NSPS or NESHAPS also conform to Regulation X and XI, respectively.
Rule 54 – Dust and Fumes	Minimizes the amount of dust that can be discharged in a specified time period.
Rule 55 – Fugitive Dust Control	Provides a mechanism to regulate operations that may cause fugitive dust emissions.
Rule 101 – Burning Control	Establishes conditions, including high winds, under which burning would be curtailed or prohibited.

TABLE 5-2
MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT (AQMD)

RULES REGULATING EXISTING AND NEW NON-POINT SOURCES IN EASTERN RIVERSIDE COUNTY OUTSIDE OF THE COACHELLA VALLEY PLANNING AREA	
RULE NUMBER AND TITLE	DESCRIPTION
Rule 403 – Fugitive Dust	Limits the amount of particulate matter that may be discharged from specific sources, not including unpaved public roads or farm roads, or industrial or commercial facilities.
Rule 404 – Particulate Matter Concentration	Limits the concentration of PM_{10} allowed in discharged gas.
Rule 405 – Solid Particulate Matter Weight	Limits the amount of PM_{10} that can be discharged on an hourly basis.

TABLE 5-3
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)
RULES REGULATING
EXISTING AND NEW NON-POINT SOURCES IN RIVERSIDE COUNTY
AND THE COACHELLA VALLEY, INSIDE OF THE COACHELLA VALLEY PLANNING AREA

RULE NUMBER AND TITLE	DESCRIPTION
Rule 403– Fugitive Dust	Requires implementation of control measures to prevent, reduce, or mitigate fugitive dust emissions.
Rule 403.1 – Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources	Establishes special requirements for Coachella Valley dust sources under high-wind conditions and requires SCAPCD approval of dust control plans for sources not subject to local government ordinances.
Rule 1156 – Further Reductions of Particulate Emissions from Cement Manufacturing Facilities	Establishes requirements to reduce particulate matter emissions from cement manufacturing operations and properties.
Rule 1157 – PM_{10} Emission Reductions from Aggregate and Related Operations	Establishes additional source specific performance standards and specifies operational PM_{10} controls specific to aggregate and related operations.
Rule 1186 – PM_{10} Emissions from Paved and Unpaved Roads and Livestock Operation	Limits the amount of particulate matter entrained as a result of vehicular travel on paved and unpaved public roads, and at livestock operations.
Rule 1466 – Control of Particulate Emissions from Soils with Toxic Air Contaminants	Establishes a PM_{10} ambient dust concentration limit, dust control measures, and notification requirements prior to earth-moving activities or when PM_{10} dust concentrations are exceeded.

V.2 Wind Observations

As previously discussed wind data analysis indicates that on April 19, 2018 different sites measured wind speeds at or above 25mph (in some instances far in excess of) 25 mph. Wind speeds of 25 mph are normally sufficient to overcome most PM_{10} control measures. During the April 19, 2018 event, wind speeds were above the 25 mph threshold, overcoming the BACM in place.

V.3 Review of Source Permitted Inspections and Public Complaints

A query of the ICAPCD permit database was compiled and reviewed for active permitted sources throughout Imperial County and specifically around the Brawley, Calexico, and Westmorland monitors during the April 19, 2018 PM_{10} exceedances. Both permitted and non-permitted sources are required to comply with Regulation VIII requirements that address fugitive dust emissions. The identified permitted sources are Aggregate Products, Inc., US Gypsum Quarry, Imperial Aggregates (Val-Rock, Inc., and Granite Construction), US Gypsum Plaster City, Clean Harbors (Laidlaw Environmental Services), Bullfrog Farms (Dairy), Burrtec Waste Industries, Border Patrol Inspection station, Centinela State Prison, various communications towers not listed and various agricultural operations. Non-permitted sources include the wind farm known as Ocotillo Express, and a solar facility known as CSolar IV West. Finally, the desert regions are under the jurisdiction of the Bureau of Land Management and the California Department of Parks (Including Anza Borrego State Park and Ocotillo Wells).

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions, officially declared as a No Burn Day, related to agricultural burning, waste burning or dust.

FIGURE 5-2
PERMITTED SOURCES

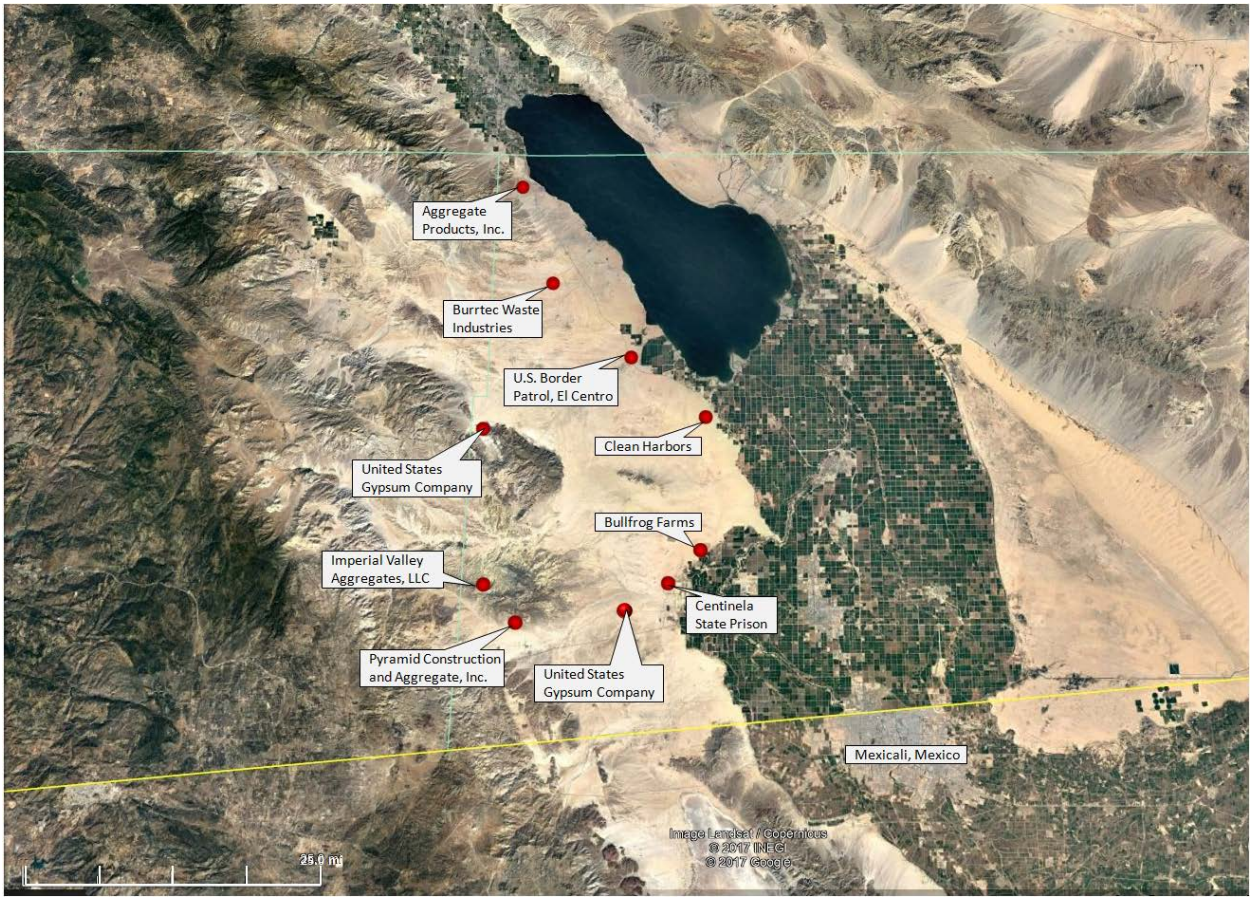


Fig 5-2: The above map identifies those permitted sources located west, northwest and southwest of the Brawley, Calexico, and Westmorland monitors. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and Mexico. The green checker-boarded areas are a mixed use of agricultural and community parcels. In addition, either the Bureau of Land Management or the California Department of Parks manages the desert areas. Base map from Google Earth

FIGURE 5-3
NON-PERMITTED SOURCES

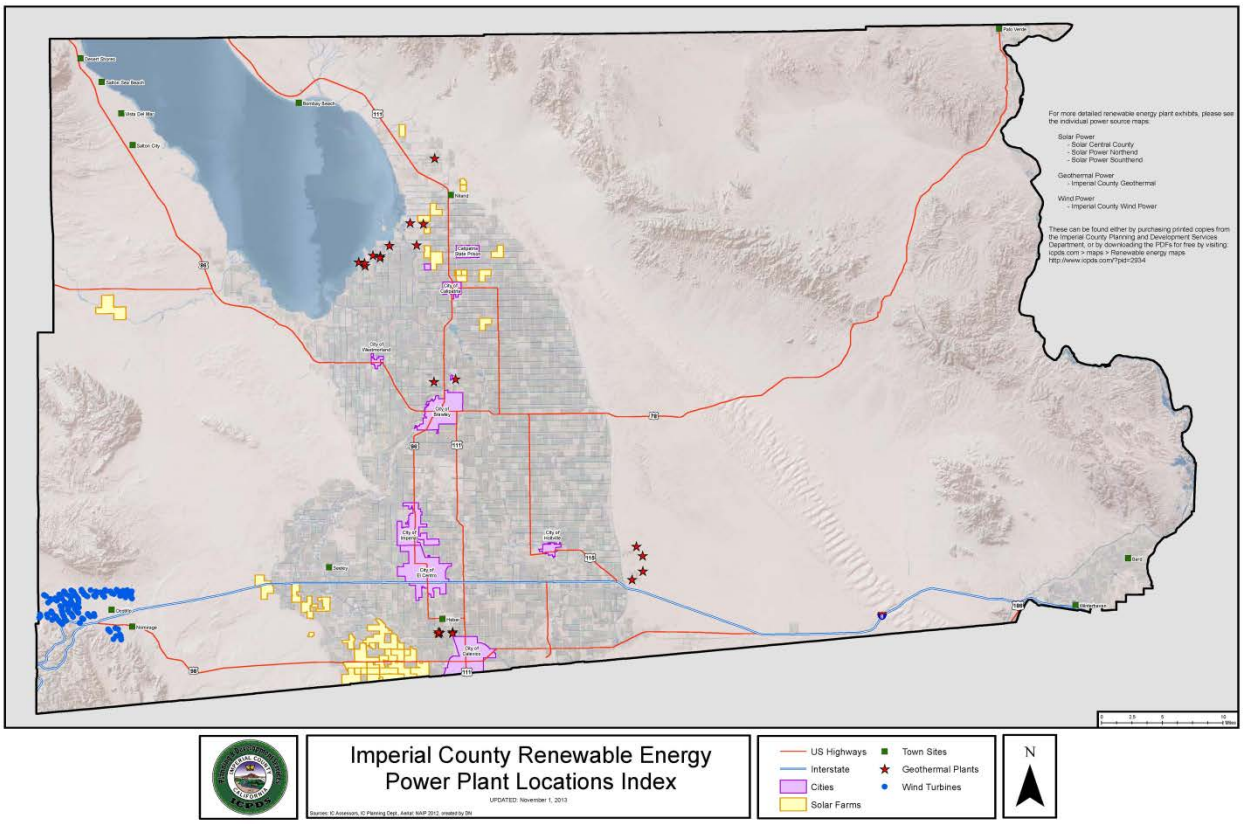


Fig 5-3: The above map identifies those power sources located west, northwest and southwest of the Brawley, Calexico, and Westmorland monitors. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

VI A Natural Event – A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.

Typically, Pacific weather disturbances during this time of year will bring westerly winds into the region. The strong gusty westerly winds on April 19, 2018 resulted from an upper level trough of low pressure (deep storm system) that created strong gusty westerly winds. These strong gusty westerly winds blew through the region and were of a magnitude that prompted the NWS offices in San Diego and Phoenix to issue nine (9) separate Urgent Weather Messages. Strong gusty westerly winds blew over and through the San Diego Mountains and the mountains ranges within Mexico generating and transporting dust emissions down slopes onto the open natural desert floor west of Imperial County.

VI.1 Affects Air Quality

The preamble to the revised EER states that an event is considered to have affected air quality if it can be demonstrated that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation. Given the information presented in this demonstration, particularly Section III, we can reasonably conclude that there exists a clear causal relationship between the monitored exceedance and the April 19, 2018 event, which changed or affected air quality in Imperial County.

VI.2 Not Reasonably Controllable or Preventable

In order for an event to be defined as an exceptional event under section 50.1(j) of 40 CFR Part 50 an event must be "not reasonably controllable or preventable." The revised preamble explains that the nRCP has two prongs, not reasonably preventable and not reasonably controllable. The nRCP is met for natural events where high wind events entrain dust from desert areas, whose sources are controlled by BACM, where human activity played little or no direct causal role. This demonstration provides evidence that the primary source areas of windblown dust transported into Imperial County came from San Diego and Mexico where Imperial County has no jurisdiction. In any event, despite BACM in place within Imperial County, high winds overwhelmed all BACM controls where human activity played little to no direct causal role. The PM_{10} exceedance measured at the Brawley, Westmorland and Calexico monitors were caused by naturally occurring strong gusty westerly winds that transported windblown dust into Imperial County and other parts of southern California from areas located within the Sonoran Desert regions to the west of Imperial County. These facts provide strong evidence that the PM_{10} exceedance at the Brawley, Westmorland and Calexico monitors on April 19, 2018, was

not reasonably controllable or preventable.

VI.3 Natural Event

The revised preamble to the EER clarifies that a "Natural Event" (50.1(k) of 40 CFR Part 50) is an event with its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. Anthropogenic sources that are reasonably controlled are considered not to play a direct role in causing emissions. As discussed within this demonstration, the PM_{10} exceedance that occurred at the Brawley, Westmorland and Calexico monitors on April 19, 2018, was caused by the transport of windblown dust into Imperial County by strong gusty westerly winds associated with an upper level trough of low pressure that passed through the region. At the time of the event, anthropogenic sources, within Imperial County were reasonably controlled with BACM. The event therefore qualifies as a natural event.

VI.4 Clear Causal Relationship

The comparative analysis of different meteorological sites to PM_{10} concentrations measured at the Brawley, Westmorland and Calexico monitors in Imperial County demonstrates a consistency of elevated gusty westerly winds with elevated concentrations of PM_{10} on April 19, 2018. In addition, temporal analysis indicates that the elevated PM_{10} concentrations and the gusty westerly winds were an event that was widespread, regional and not preventable. Days before the high wind event PM_{10} concentrations were well below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the transported windblown dust to the exceedance on April 19, 2018.

VI.5 Concentration to Concentration Analysis

The historical annual and seasonal 24-hr average PM_{10} measured concentrations at the Brawley, Westmorland and Calexico monitors were outside the normal historical concentrations when compared to event and non-event days.

VI.6 Conclusion

The preceding discussion, graphs, figures, and tables provide wind direction, speed and concentration data illustrating the spatial and temporal effects of the strong gusty westerly winds that preceded an upper level trough of low pressure as it passed through the southern region of California. The information provides a clear causal relationship between the entrained windblown dust and the PM_{10} exceedance measured at the

Brawley, Westmorland and Calexico monitors in Imperial County on April 19, 2018.

In particular, the clear causal relationship and not reasonably controllable or preventable sections provide evidence that high gusty westerly winds transported fugitive emissions from open natural Mountain and desert areas, located within San Diego County, Mexico and Imperial County (all part of the Sonoran Desert). In addition, because anthropogenic sources in upwind areas were reasonably controlled at the time of the event, this event meets the definition of a Natural Event.[20]

[20] Title 40 Code of Federal Regulations part 50: §50.1(k) Natural event means an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.