IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

Audubon, Pacific Flyway, California, Burrowing Owl: https://ca.audubon.org/birds-0/burrowing-owl

May 25, 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 and Calexico monitors in Imperial County, California on May 25, 2018

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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. 17
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. 25
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	Pg. 30
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. 37

[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. 3 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 Friday, May 25, 2018 which elevated particulate matter within San Diego, Riverside and Imperial 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 May 23, 2018 through May 25, 2018, the ICAPCD published advisories concerning the potential for elevated concentrations of particulate matter caused by gusty westerly winds preceding the passage of a low-pressure system by Friday, May 25, 2018. **Appendix C** contains copies of notices pertinent to the May 25, 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 Friday, May 25, 2018, a naturally occurring event elevated particulate matter within San Diego, Riverside and Imperial Counties, causing an exceedance at the Brawley (06-025-0007) and Calexico (06-025-0005) air quality monitoring stations. 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 and Calexico monitors on May 25, 2018. After review, CARB submitted the INPEE, for the May 25, 2018 event in July of 2019. The submitted request included a brief description of the meteorological conditions for May 25, 2018 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 May 25, 2018 exceptional event prepared by the ICAPCD. After addressing all substantive and non-substantive comments by both CARB and USEPA the ICAPCD

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

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 159 µg/m^3 measured by the Brawley monitor and 156 µg/m^3 measured by the Calexico monitor on May 25, 2018.

(B) Concurrently with the Public Review period for the May 25, 2018 exceptional event, the ICAPCD is formally submitting to CARB for remittance to USEPA the Final May 25, 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

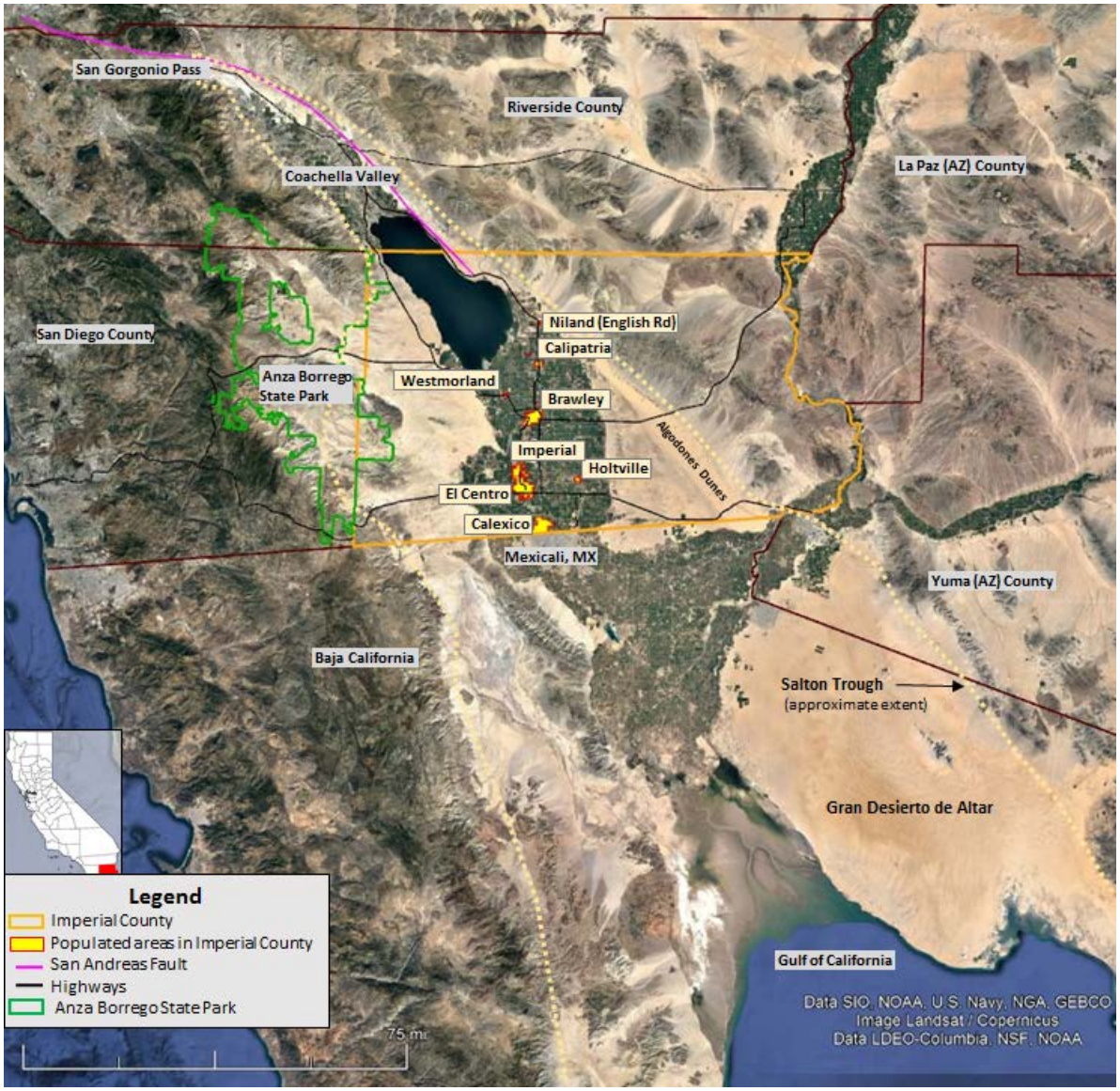


Fig 1-1: Imperial County a Southern California border region, within far southeast California bordering Arizona and Mexico has a small economically diverse region with a population of 174,528

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 Friday, May 25, 2018 the National Weather Service (NWS) offices in Phoenix and San Diego issued Area Forecast Discussions describing a deep trough off the California coast poised to move slowly inland into Central California by Friday, May 25, 2018.[4] The low-pressure system deepens the marine layer creating a possibility of patchy drizzle, and causes a stronger onshore flow with stronger gusty southwest to west winds within the mountains and deserts as it moves inland.[5] Although the westerly flow over the San Diego mountains would promote stronger downslope winds into Imperial County the Phoenix office explained that the temporal alignment of the synoptic weather features were not optimal for the winds to create widespread and dense blowing dust and sand.[6] Thus, neither office issued Urgent Weather Messages for the event. However, some patchy blowing dust was a distinct possibility in Imperial County.[7]

The description provided by the San Diego summarized much of the expected impacts of the approaching weather disturbance:

> "A low pressure system off of the California coast will move slowly inland for tonight through Saturday. This will maintain onshore flow…strongest for Friday and Saturday with periods of stronger and gusty southwest to west winds in the mountains and deserts from Friday afternoon into Saturday evening."[8]

Appendix A contains all pertinent NWS notices.

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

On May 25, 2018, the air monitors in Imperial, Riverside and Yuma counties measured elevated concentrations of particulate matter when a forecasted low-pressure system moved inland from the Pacific coast into California. The strong gusty westerly winds ahead of the 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

[4] National Weather Service, Area Forecast Discussion, May 24, 2018, San Diego office, 210pm PDT
[5] National Weather Service, Area Forecast Discussion, May 23, 2018, San Diego office, 316am PDT
[6] National Weather Service, Area Forecast Discussion, May 24, 2018, Phoenix office, 130pm MST
[7] National Weather Service, Area Forecast Discussion, May 24, 2018, Phoenix office, 305am MST
[8] National Weather Service, Area Forecast Discussion, May 24, 2018, San Diego office, 333am PDT

monitors causing an exceedance of the PM_{10} NAAQS (**Table 2-1**).

FIGURE 2-1
MONITORING AND METEOROLOGICAL SITES

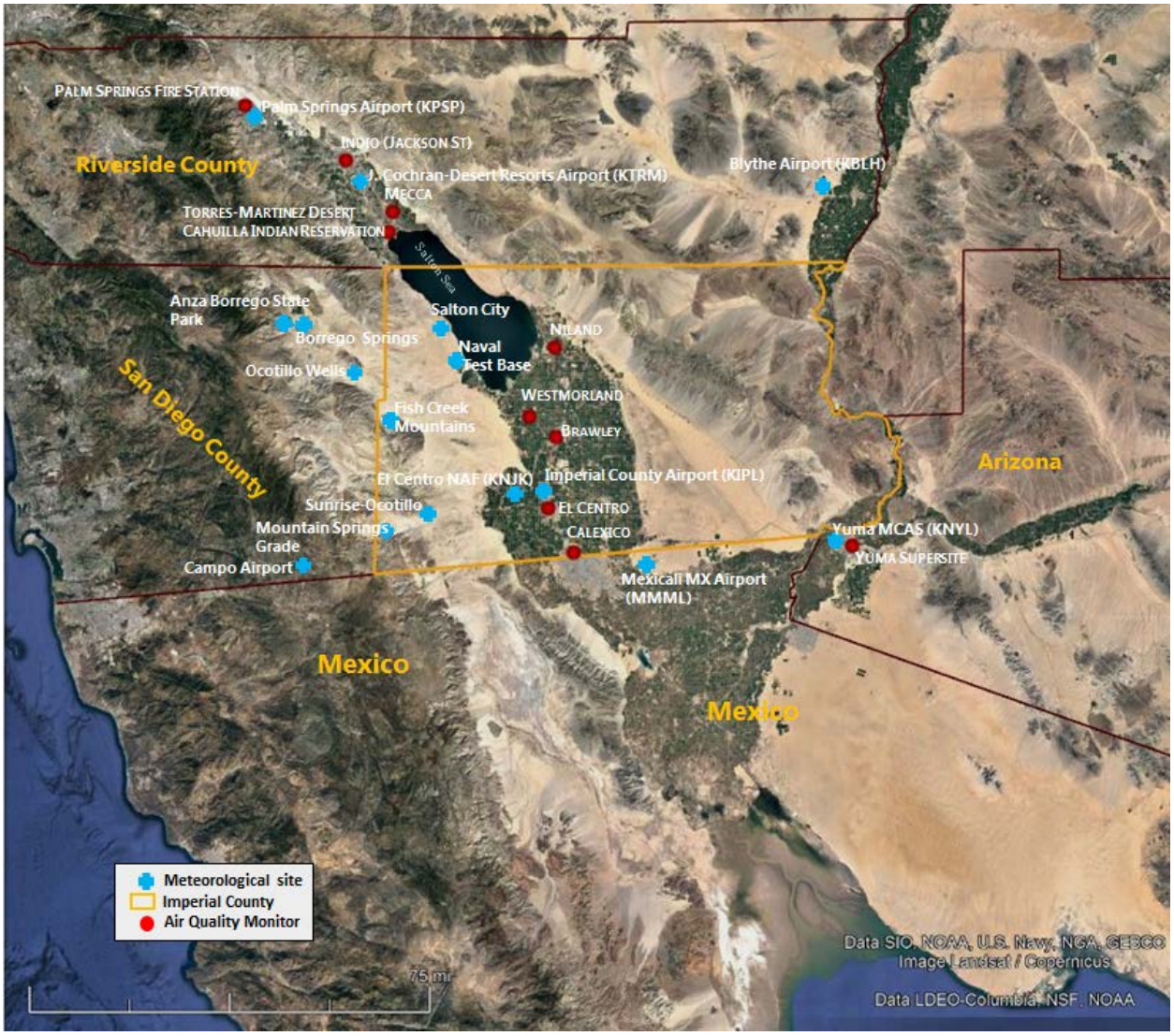


Fig 2-1: Includes a general location of the sites used in this analysis. The site furthest south is in Mexicali, Mexico and the site furthest north is the Palm Springs Fire Station

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	20180524	17	14	11	8	9	9	14	14	13	11	13	14	19	24	19	17	25	22	23	26	18	11	10	9	26	15
	20180525	12	15	9	8	9	10	15	12	12	19	16	16	17	23	17	10	22	32	18	21	21	16	21	20	**32**	16
	20180526	12	15	13	11	15	13	11	11	12	14	16	10	37	17	16	15	14	18	21	17	17	18	14	16	37	15
INDIO	20180524	31	27	24	13	12	15	21	12	20	20	17	19	16	33	17	22	43	38	31	53	26	15	6	20	53	22
	20180525	31	11	16	18	13	20	48	121	29	25	15	11	10	43	27	37	64	82	66	92	207	142	121	147	**207**	58
	20180526	127	229	89	86	62	73	43	94	30	18	52	16	37	118	93	111	129	81	88	67	43	41	70	27	229	76
MECCA	20180524	28	28	20	27	46	54	31	32	10	17	14			33	30	40	41	42	58	60	56	30	24	18	60	33
	20180525	16	19	100	51	43	32	63	139	104	180	31	26	31	26	29	53	112	54	183	89	296	160	33	25	**296**	78
	20180526	44	172	34	21	18	32	52	39	35	29	46	31	27	41	60	102	119	125	136	129	69	53	47	49	172	62
TORRES-MARTINEZ TRIBAL	20180524	39	35	26	25	29	35	30	37	31	23	33	42	60	44	167	78	38	43	52	79	134	65	28	24	167	49
	20180525	47	32	32	36	26	106	43	40	32	44	36	30	30	20	39	36	116	111	154	154	319	140	50	69	**319**	72
	20180526	52	82	54	19	27	35	20	24	22	19		32	33	91	173	98	218	291	153	150	158	93	91	50	291	86
WESTMORLAND	20180524	31	23	15	12	49	30	108	66	73	65	70	56	51	44	55	66	59	50	51	170	511	480	267	256	511	110
	20180525	174	25	42	94	53	71	57	150	52	43	12	26	30	66	205	183	142	311	424	460	261	63	362	342	**460**	152
	20180526	244	197	121	76	27	31	110	73	46	133	300	283	98	72	147	119	88	57	57	15	17	24	21	26	300	99
BRAWLEY	20180524	26	26	23	18	18	21	55	51		44	35		41	46	52	65	44	65	75	35	125	174	42	268	268	61
	20180525	172	100	56	78	50	73	57	115	42	25	14	18	28	33	121	162	169	221	380	988	315	232	147	231	**988**	159
	20180526	296	480	211	143	40	118	57	222	210	121	115	498	233	92	150	100	92	65	82	99	24	15	14	26	498	145
NILAND	20180524	28	16	9	16	18	24	23	20	64	61	40	42	46	44	43	43	49	61	60	254	553	995	542	346	995	141
	20180525	112	26	25	24	28	26	22	26	32	19	27	15	17	36	152	209	171	102	113	643	453	384	272	199	**643**	130
	20180526	259	266	197	69	29	26	52	67	63	18	34	289	173	245	275	175	133	107	50	33	45	45	28	21	289	112
EL CENTRO	20180524	56	28	13	24	28	52	52	59	63	48	46	40	52	56	61	78	66	72	53	53	37	40	46	72	78	49
	20180525	47	64	56	52	47	82	77	68		26	58	41	69	29	39	46	142	297	134	260	191	401	383	221	**401**	123
	20180526	231	453	85	20	15	22	39	48	25	17	22	54	76	25	26	23	43	55	38	23	25	14	14	13	453	58
CALEXICO	20180524	25	13	15	14	22	54	52	53	58	50	34	45	49	41	58	62	63	56	51	47	47	44	36	39	63	42
	20180525	53	36	72	58	58	65	51	45	57	35	40	92	242	114	47	115	563	751	364	331	120	161	137	137	**751**	156
	20180526	81	75	95	52	28	40	73	89	188	53	54	133	121	101	80	40	44	70	34	20	16	7	12	14	188	63
YUMA AZ SUPERSITE (PST)	20180524	8	7	7	24	44	113	56	39	25	20	17	20	20	20	14	17	23	14	18	16	16	6	8	9	113	23
	20180525	24	20	47	107	92	47	70	67	66	53	46	40	103	29	50	40	38	80	318	272	282	521	345	130	**521**	120
	20180526	243	278	205	155	105	52	55	92	128	179	101	129	122	222	112	265	164	153	188	86	51	30	20	22	278	131
YUMA AZ SUPERSITE (MST)	20180524	9	8	7	7	24	44	113	56	39	25	20	17	20	20	20	14	17	23	14	18	16	16	6	8	113	23
	20180525	9	24	20	47	107	92	47	70	67	66	53	46	40	103	29	50	40	38	80	318	272	282	521	345	**521**	115
	20180526	130	243	278	205	155	105	52	55	92	128	179	101	129	122	222	112	265	164	153	188	86	51	30	20	278	136

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

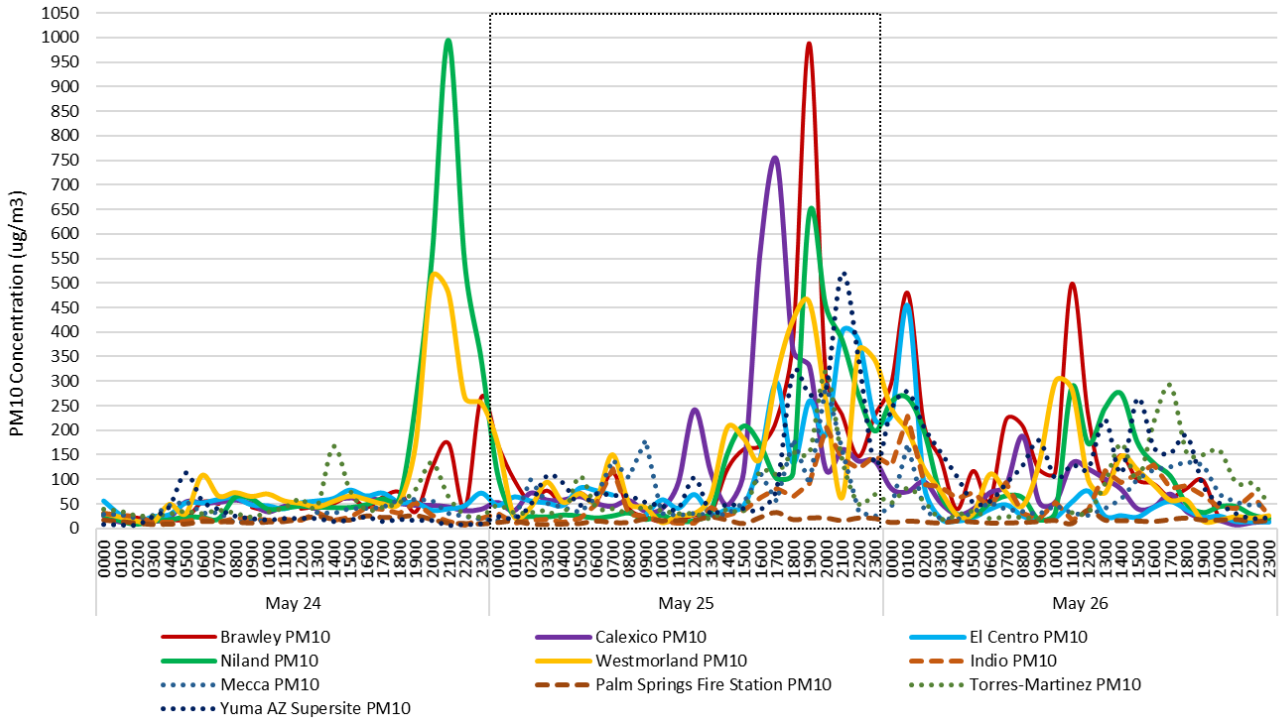


Fig 2-2: is a three-day graphical representation of the PM_{10} concentrations measured at the sites identified in **Table 2-1**. Note the general consistency among the air quality monitors

Wind speed, wind direction and the airflow patterns combined all help explain how windblown emissions resulting from the strong gusty westerly winds associated with the passing of the trough affected all monitors in Imperial County on Friday, May 25, 2018.

As mentioned above, the early weather forecast notices issued by both the San Diego and Phoenix NWS offices indicated that as a deep trough off the California coast moved inland into central California the onshore pressure gradient would strengthen and generate strong gusty westerly winds across portions of southeastern California. Although neither NWS office issued Urgent Weather Messages, patchy blowing dust from strong gusty westerly winds were forecasted to affect Imperial County.[9]

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, coincident with measured elevated concentrations.

[9] National Weather Service, Area Forecast Discussion, May 24, 2018, Phoenix office, 305am MST

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

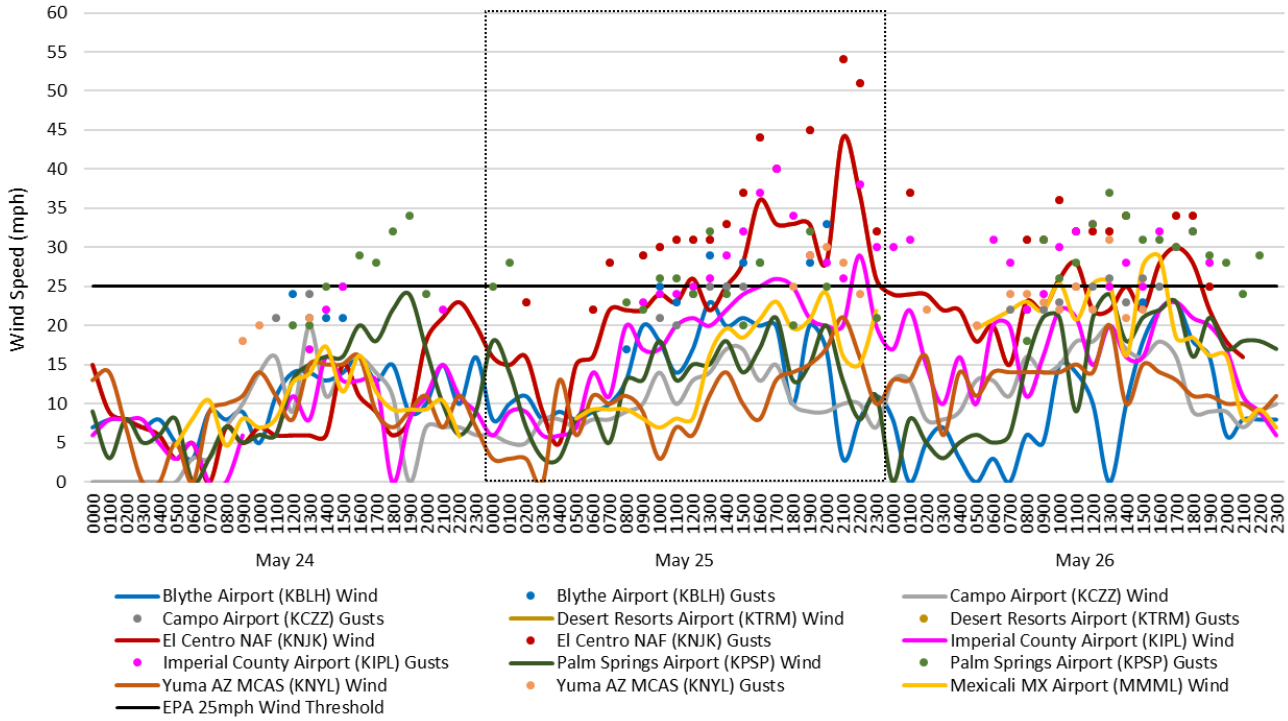


Fig 2-3: is a three-day graphical representation of the measured wind speed and wind gusts (if available) from local and neighboring airports. All data derived from the Local Climatological Data Hourly Observations (LCDHO) reports released by the NOAA https://www.ncdc.noaa.gov/. MMML is from the University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

FIGURE 2-4
WIND SPEEDS AND GUST UPSTREAM SITES

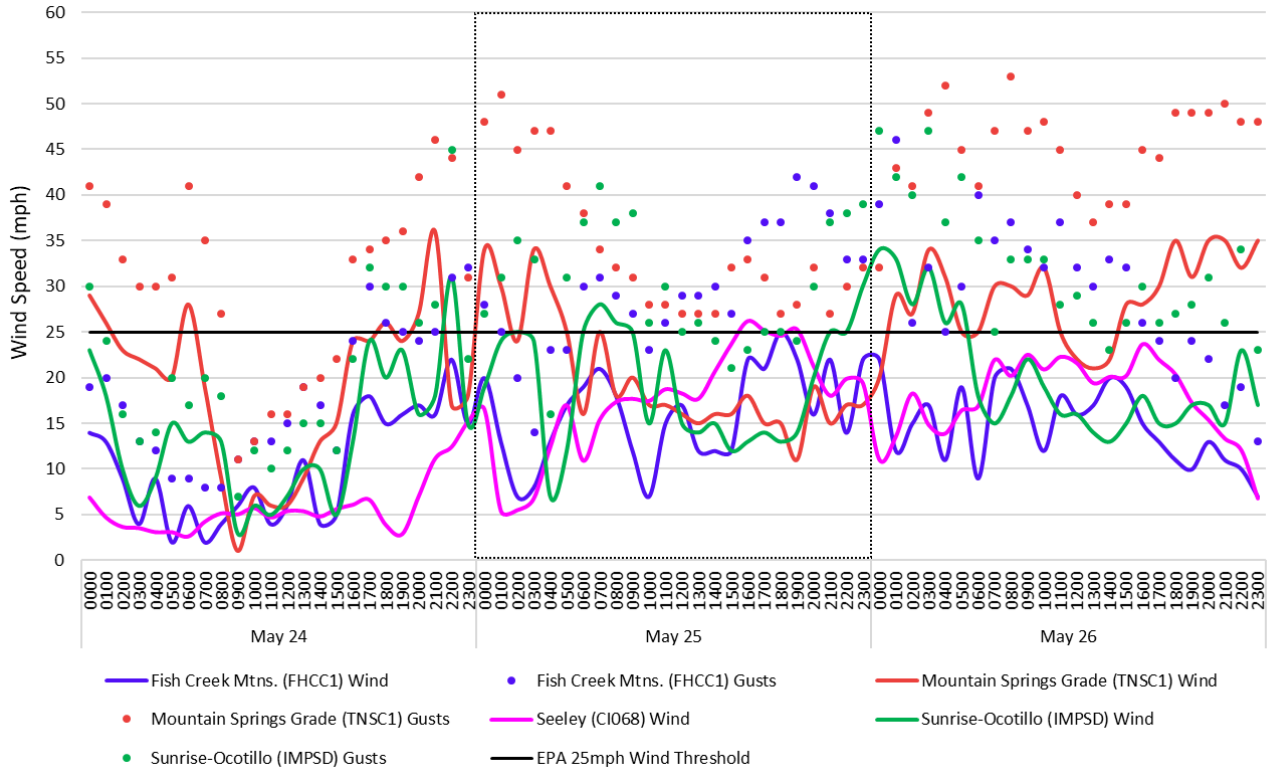


Fig 2-4: is a three-day graphical representation of the measured wind speed and wind gust (if available) from sites located upwind from the Imperial County monitors. All data derived from the University of Utah's Meso West https://mesowest.utah.edu/index.html

The National Oceanic and Atmospheric Administration (NOAA) Laboratory HYSPLIT back-trajectory models[10] provide supporting evidence of the westerly airflow within Imperial County on May 25, 2018. The HYSPLIT back-trajectory models, **Figures 2-5 and 2-7**, depict the airflow during the mid-day hour (1200 PST) and the late afternoon hour (1700 PST) help illustrate the westerly airflow that affected Imperial County.

Figure 2-5 depicts the westerly airflow coincident with an elevated concentration above 100 µg/m^3 at the Calexico monitor. **Figure 2-6** depicts the late afternoon westerly airflow coincident with the peak hourly measured concentration at the Calexico monitor.

[10] 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.

FIGURE 2-5
HYSPLIT MODEL All SITES MAY 25, 2018 1200 PST

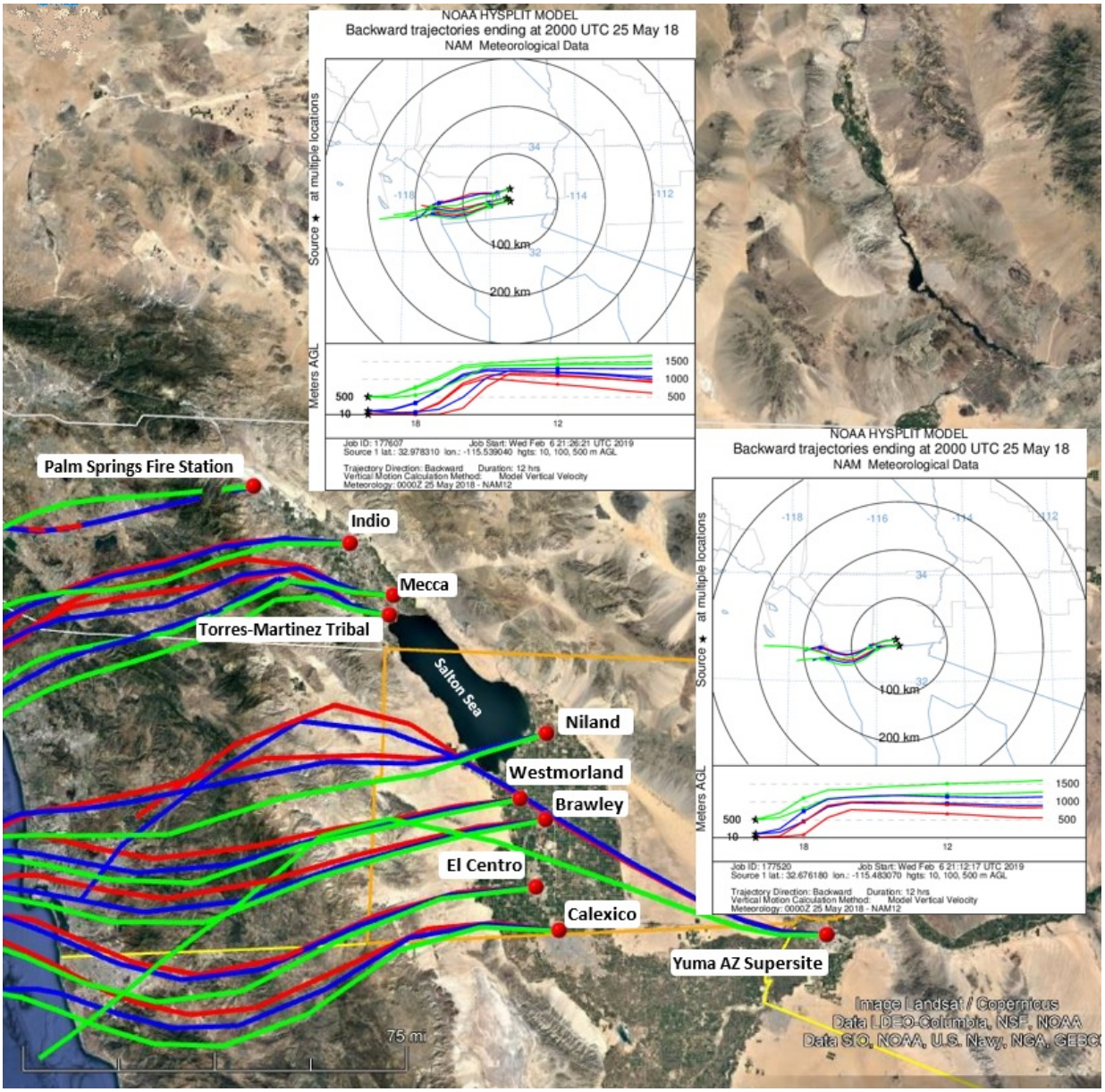


Fig 2-5: A 12-hour HYSPLIT back-trajectory ending at 1200 PST for all sites identified in **Table 2-1**. Note the westerly airflow. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

FIGURE 2-6
HYSPLIT MODEL All SITES MAY 25, 2018 1700 PST

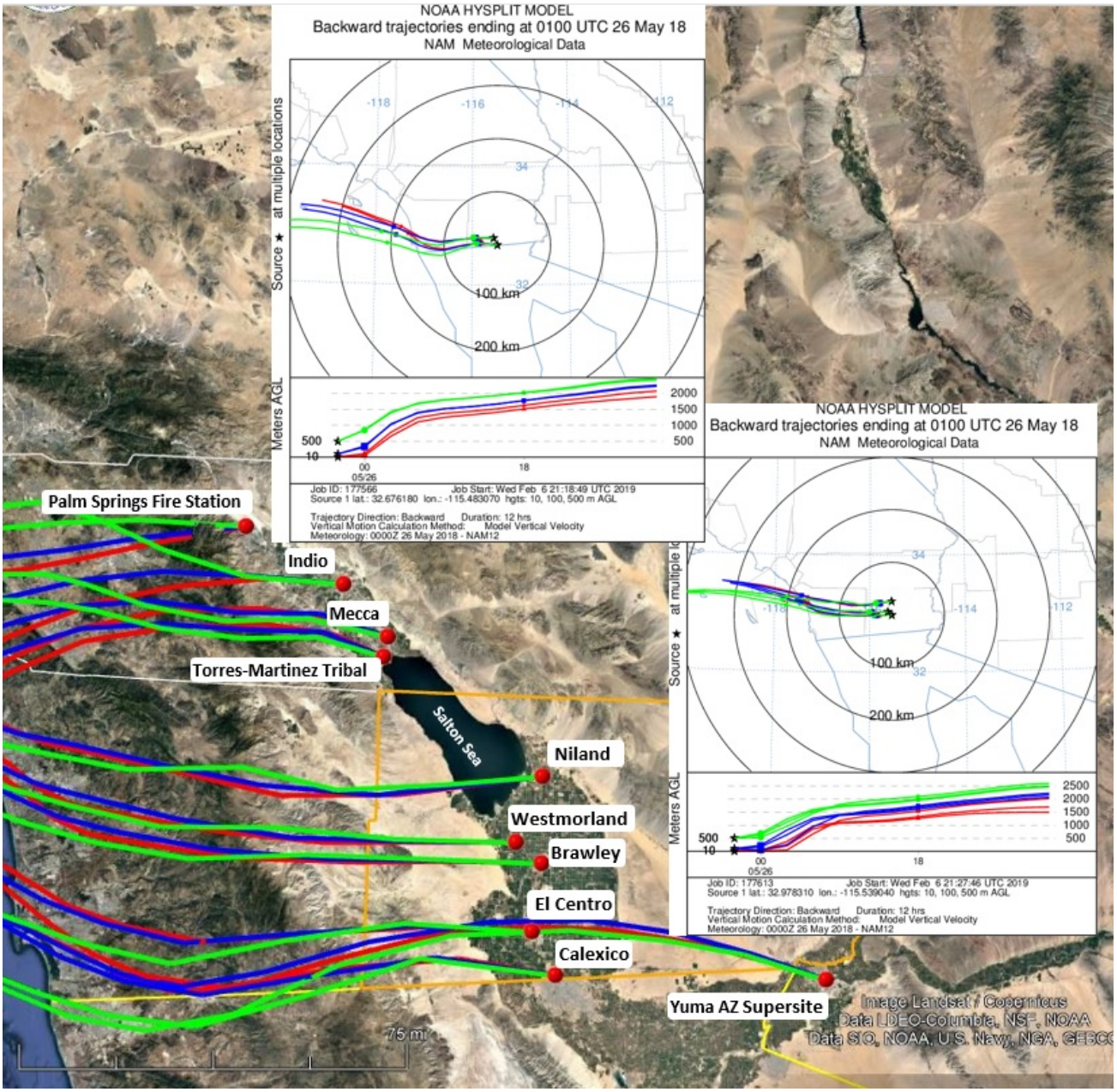


Fig 2-6: A 12-hour back-trajectory HYSPLIT ending at 1700 PST for all sites identified in **Table 2-1**. Note the westerly airflow. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

As strong gusty westerly winds blew open natural mountains and desert areas west of Imperial County, fugitive windblown dust affected all air quality monitors throughout the southeastern region. On May 25, 2018 both local airports measured several hours of winds or gusts above 25 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 a deep trough off the California coast moved slowly inland into central California deepening the marine layer, for a possibility of patchy drizzle, strengthened the onshore flow with stronger gusty southwest to west winds within the mountains and deserts.[11] Because the trough was not forecasted to create widespread and dense blowing dust and sand neither office issued Urgent Weather Messages for the event.[12] While reduced visibility was reported by some of the airports, i.e. the El Centro NAF (KNJK), none of the local airports identified blowing dust. Still, NOAA's Satellite Smoke Text Product described "[r]ther subtle areas of blowing dust…resulting from locally strong gusty winds over…southern California near and south of the Salton Sea…"(**Appendix C**).

Perhaps the best description of the event is provided by the San Diego NWS office.

> "…Rain and drizzle were widespread in the San Diego and Orange County coastal and valley areas this morning….A deep trough off the California coast this afternoon will move inland into central CA Friday. The marine layer will remain very deep tonight and Friday, and there may be areas of light rain or drizzle again tomorrow morning….The trough and accompanying strong onshore surface gradients will bring strong and gusty west winds to the mountains and deserts Friday and Saturday afternoon and evening…"[13]

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.[14] As winds and gusts increased on May 25, 2018 and transported windblown dust from open natural mountains and deserts into Imperial County air quality degraded. As mentioned in Section I.1 above, the ICAPCD issued an advisory of the potential for elevated particulate matter and the potential of degradation of air quality to a moderate or unhealthy level. In addition, the NWS service issued Area Forecast Discussions describing the gusty westerly winds and the potential for patchy blowing dust.

Figure 3-1 below provides an illustration of some of the meteorological conditions as described above and demonstrated in the HYSPLITS, for May 25, 2018, which affected air

[11] National Weather Service, Area Forecast Discussion, May 23, 2018, San Diego office, 316am PDT
[12] National Weather Service, Area Forecast Discussion, May 24, 2018, Phoenix office, 130pm MST
[13] National Weather Service, Area Forecast Discussion, May 24, 2018, San Diego office, 210pm PDT
[14] 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

quality in Imperial County causing an exceedance, that can only be described as barely reaching, at the Calexico and Brawley monitors. As windblown dust emissions, generated within the natural open mountains within San Diego blew into and over natural open deserts within Imperial County air quality was affected by a sufficient amount of dust.

FIGURE 3-1
VISUAL RAMP-UP ANALYSIS AS DISCUSSED FOR MAY 25, 2018

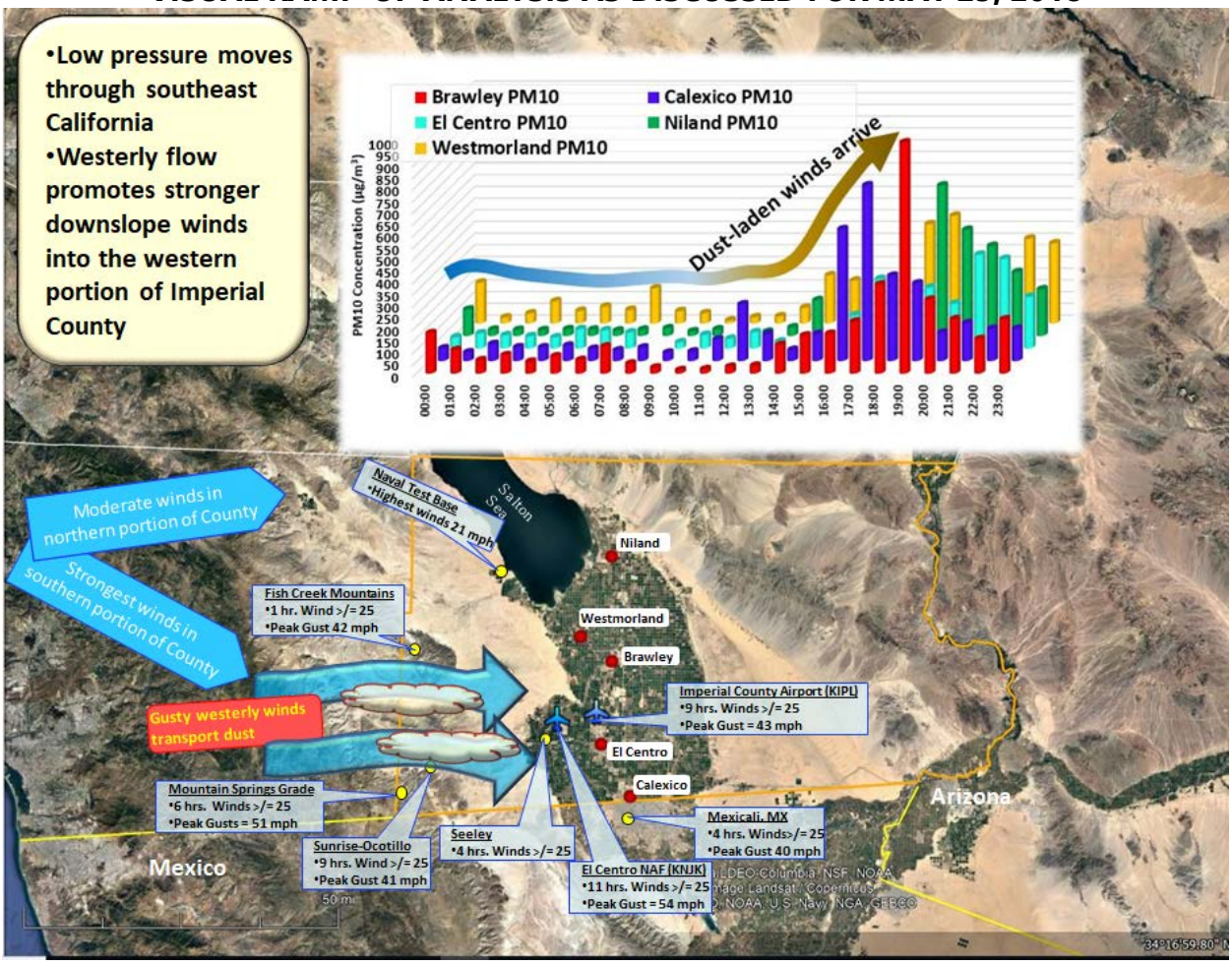


Fig 3-1: On May 25 2018, a low-pressure system moved across southeast California, creating strong gusty westerly winds. Air quality monitors in Imperial County all measured 24-hr averaged PM_{10} concentrations above 100 µg/m^3, with the Calexico and Brawley monitors exceeding the NAAQS by 1 µg/m^3 and 4 µg/m^3, respectively. Google Earth base map

An indicator of the effect to 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.[15] The El Centro NAF (KNJK) and The

[15] According to the NWS there is a difference between human visibility and the visibility measured by an Automated Surface Observing System (ASOS) or an Automated Weather Observing System (AWOS). The automated sensors measure clarity of the air vs. how far one can "see". The more moisture, dust, snow, rain, or particles in the light beam the more light scattered. The sensor measures the return every 30 seconds. The visibility value transmitted is the average 1-minute value from the past 10 minutes. The sensor samples

Imperial County Airport (KIPL) both reported reduced visibility coincident with elevated wind speeds, wind gusts and elevated hourly concentrations of particulates at all air quality monitors. **Figure 3-2** and **Tables 3-1 through 3-3** 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 through 3-3** provide a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM_{10} concentrations at all the air quality monitors in Imperial County. 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 both of the local airports, the El Centro NAF (KNJK) and the Imperial County Airport (KIPL) on May 25, 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

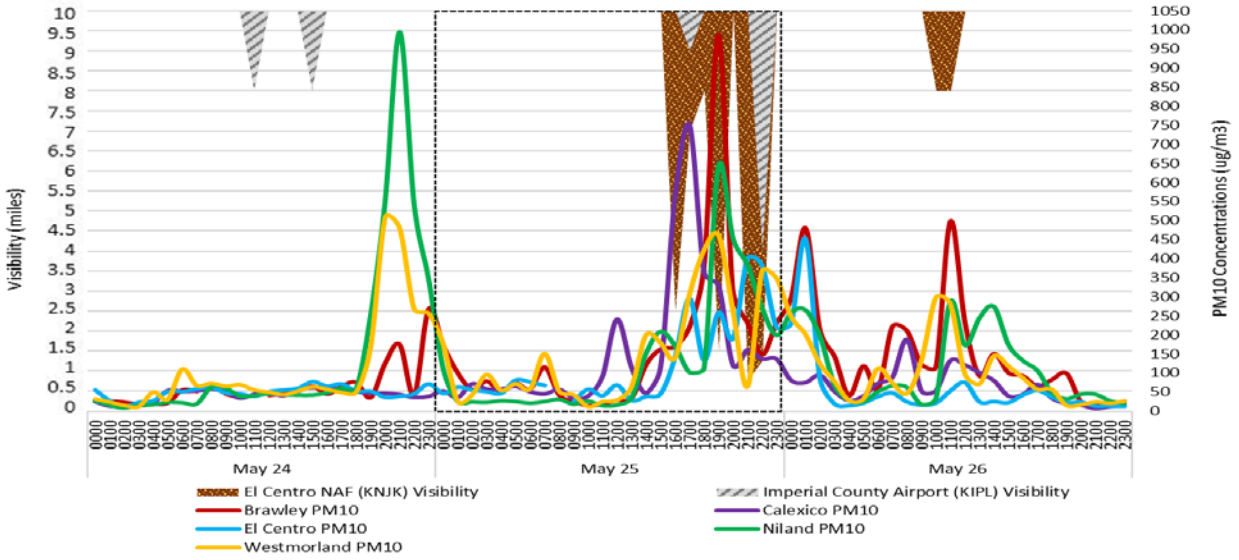


Fig 3-2: is a graphical representation of the compiled data from Imperial County Airport (KIPL) and El Centro NAF (KNJK). Reported reduced visibility is coincident with elevated winds and hourly levels of concentrations either just prior to peak concentrations or after. Visibility data from the NCEI's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

only a small segment of the atmosphere, 0.75 feet. Therefore, a representative visibility utilizes an algorithm. Siting of the visibility sensor is critical and large areas should provide multiple sensors to provide a representative observation; http://www.nws.noaa.gov/asos/vsby.htm

Because the EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states[16] the **Tables 3-1 through 3-3** 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.

TABLE 3-1
WIND SPEED AND PM_{10} CONCENTRATIONS MAY 25, 2018

	MOUNTAIN SPRINGS GRADE (TNSC1)			SUNRISE-OCOTILL0 (IMPSD)			FISH CREEK MOUNTAINS (FHCC1)			EL CENTRO NAF (KNJK)			IMPERIAL COUNTY AIRPORT (KIPL)				BRAWLEY
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	OBS.	PM_{10} (ug/m^3)
000	34	48	206	19	27	209	20	28	200	16		270	6		300		172
100	30	51	204	24	31	201	13	25	201	15		270	9		260		100
200	24	45	207	25	35	207	7	20	195	16	23	250	9		270		56
300	34	47	209	24	33	210	8	14	178	9		280	6		270		78
400	30	47	211	7	16	267	13	23	212	5		350	6		320		50
500	25	41	209	12	31	309	17	23	206	15		280	7		320		73
600	16	38	218	25	37	245	19	30	217	16	22	270	14		280		57
700	25	34	203	28	41	243	21	31	221	22	28	260	11		280		115
800	18	32	203	26	37	243	18	29	218	22		260	20		280		42
900	20	31	215	25	38	245	12	27	209	22	29	280	17	23	290		25
1000	17	28	247	15	26	265	7	23	216	24	30	260	17	24	250		14
1100	17	28	251	23	30	244	15	26	269	23	31	240	20	24	260		18
1200	16	27	212	15	25	257	17	29	259	26	31	250	21	25	250		28
1300	15	27	243	14	26	257	12	29	280	22	31	250	20	26	260		33
1400	16	27	254	15	24	257	12	30	285	25	33	250	22	29	250		121
1500	16	32	244	12	21	266	12	27	286	28	37	260	24	32	260		162
1600	18	33	254	13	23	268	22	35	256	36	44	260	25	37	260		169
1700	15	31	245	14	25	267	21	37	257	33	40	270	26	40	270		221
1800	15	27	256	13	25	267	25	37	260	33		270	25	34	270		380
1900	11	28	227	14	24	261	22	42	257	33	45	260	21	29	280		988
2000	19	32	219	20	30	251	16	41	251	28		270	20	28	290		315
2100	15	27	217	25	37	246	22	38	237	44	54	250	20	26	260		232
2200	17	30	222	25	38	247	14	33	224	37	51	260	29	38	260	HZ	147
2300	17	32	209	30	39	239	22	33	240	26	32	260	20	30	260		231

Wind data for KIPL and KNJK from the NCEI's QCLCD system. Wind data for Fish Creek Mountains (FHCC1), Mountain Springs Grade (TNSC1), and Sunrise-Ocotillo (IMPSD) from the University of Utah's MesoWest system https://mesowest.utah.edu/index.html. Wind speeds = mph; Direction = degrees. HZ=Haze. 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

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

TABLE 3-2
WIND SPEED AND PM_{10} CONCENTRATIONS MAY 25, 2018

	MOUNTAIN SPRINGS GRADE (TNSC1)			SUNRISE-OCOTILL0 (IMPSD)			SEELEY (CI068)		MEXICALI, MEXICO (MXCB1)			EL CENTRO NAF (KNJK)			CALEXICO
HOUR	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/D	W/S	W/G	W/D	W/S	W/G	W/D	PM_{10} (ug/m^3)
000	34	48	206	19	27	209	17	271	6	60	8	16		270	53
100	30	51	204	24	31	201	5	126	4	89	6	15		270	36
200	24	45	207	25	35	207	6	303	6	335	10	16	23	250	72
300	34	47	209	24	33	210	7	314	6	320	8	9		280	58
400	30	47	211	7	16	267	12	304	7	300	8	5		350	58
500	25	41	209	12	31	309	17	274	8	317	13	15		280	65
600	16	38	218	25	37	245	11	290	9	324	12	16	22	270	51
700	25	34	203	28	41	243	15	298	9	312	13	22	28	260	45
800	18	32	203	26	37	243	17	286	10	320	14	22		260	57
900	20	31	215	25	38	245	18	270	12	299	16	22	29	280	35
1000	17	28	247	15	26	265	17	279	7	339	11	24	30	260	40
1100	17	28	251	23	30	244	19	272	19	291	27	23	31	240	92
1200	16	27	212	15	25	257	18	268	23	307	32	26	31	250	242
1300	15	27	243	14	26	257	18	268	23	291	34	22	31	250	114
1400	16	27	254	15	24	257	21	273	21	297	28	25	33	250	47
1500	16	32	244	12	21	266	24	275	25	298	36	28	37	260	115
1600	18	33	254	13	23	268	26	283	26	296	37	36	44	260	563
1700	15	31	245	14	25	267	25	290	25	291	38	33	40	270	751
1800	15	27	256	13	25	267	25	286	24	297	34	33		270	364
1900	11	28	227	14	24	261	25	282	24	293	35	33	45	260	331
2000	19	32	219	20	30	251	21	283	21	300	31	28		270	120
2100	15	27	217	25	37	246	18	303	21	321	27	44	54	250	161
2200	17	30	222	25	38	247	20	322	25	303	35	37	51	260	137
2300	17	32	209	30	39	239	19	307	19	301	26	26	32	260	137

Wind data for KNJK from the NCEI's QCLCD system. Wind data for Mexicali (MXCB1), Mountain Springs Grade (TNSC1), Seeley (CI068) and Sunrise-Ocotillo (IMPSD) from the University of Utah's MesoWest system https://mesowest.utah.edu/index.html. Wind speeds = mph; Direction = degrees. 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 3-3
WIND SPEED AND PM_{10} CONCENTRATIONS MAY 25, 2018

	SUNRISE-OCOTILL0 (IMPSD)			SEELEY (CI068)		EL CENTRO NAF (KNJK)			IMPERIAL COUNTY AIRPORT (KIPL)				NAVAL TEST BASE		WSTMLD	BRLY	NLND	EC	CX
HOUR	W/S	W/G	W/D	W/S	W/D	W/S	W/G	W/D	W/S	W/G	W/D	OBS.	W/S	W/D	PM_{10} (ug/m^3)				
000	19	27	209	17	271	16		270	6		300		10	260	174	172	112	47	53
100	24	31	201	5	126	15		270	9		260		14	245	25	100	26	64	36
200	25	35	207	6	303	16	23	250	9		270		15	264	42	56	25	56	72
300	24	33	210	7	314	9		280	6		270		16	266	94	78	24	52	58
400	7	16	267	12	304	5		350	6		320		16	276	53	50	28	47	58
500	12	31	309	17	274	15		280	7		320		15	281	71	73	26	82	65
600	25	37	245	11	290	16	22	270	14		280		17	281	57	57	22	77	51
700	28	41	243	15	298	22	28	260	11		280		15	284	150	115	26	68	45
800	26	37	243	17	286	22		260	20		280		17	280	52	42	32		57
900	25	38	245	18	270	22	29	280	17	23	290		13	276	43	25	19	26	35
1000	15	26	265	17	279	24	30	260	17	24	250		11	276	12	14	27	58	40
1100	23	30	244	19	272	23	31	240	20	24	260		14	284	26	18	15	41	92
1200	15	25	257	18	268	26	31	250	21	25	250		11	318	30	28	17	69	242
1300	14	26	257	18	268	22	31	250	20	26	260		14	287	66	33	36	29	114
1400	15	24	257	21	273	25	33	250	22	29	250		20	273	205	121	152	39	47
1500	12	21	266	24	275	28	37	260	24	32	260		19	263	183	162	209	46	115
1600	13	23	268	26	283	36	44	260	25	37	260		21	262	142	169	171	142	563
1700	14	25	267	25	290	33	40	270	26	40	270		21	252	311	221	102	297	751
1800	13	25	267	25	286	33		270	25	34	270		20	248	424	380	113	134	364
1900	14	24	261	25	282	33	45	260	21	29	280		22	258	460	988	643	260	331
2000	20	30	251	21	283	28		270	20	28	290		21	254	261	315	453	191	120
2100	25	37	246	18	303	44	54	250	20	26	260		22	258	63	232	384	401	161
2200	25	38	247	20	322	37	51	260	29	38	260	HZ	20	259	362	147	272	383	137
2300	30	39	239	19	307	26	32	260	20	30	260		19	263	342	231	199	221	137

Wind data for KIPL and KNJK from the NCEI's QCLCD system. Wind data for Seeley (CI068), Sunrise-Ocotillo (IMPSD) and Naval Test Base from the University of Utah's MesoWest system https://mesowest.utah.edu/index.html. Naval Test Base from AQMIS. Naval Test Base and Seeley do not measure wind gusts. Wind speeds = mph; Direction = degrees. HZ=Haze. 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 all described the gusty westerly winds for the region extending from the San Diego County Mountains and Imperial County. The deep trough strengthened the pressure gradient and produced strong gusty westerly winds that affected different regional air monitors in Riverside County, Imperial County and Arizona (**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.[17] As transported windblown dust entered Imperial County on the afternoon of May 25, 2018, air quality degraded in Imperial County. Overall, the strong westerly winds associated with the low-pressure system affected air quality in Imperial County.

FIGURE 3-3
IMPERIAL VALLEY AIR QUALITY INDEX FOR BRAWLEY
MAY 25, 2018

Fig 3-3: The degradation, or affect upon air quality, maybe determined when the AQI changes from a "Yellow" or a Moderate level to an "Orange" level or a level that is Unhealthy for sensitive groups

[17] 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
MAY 25, 2018

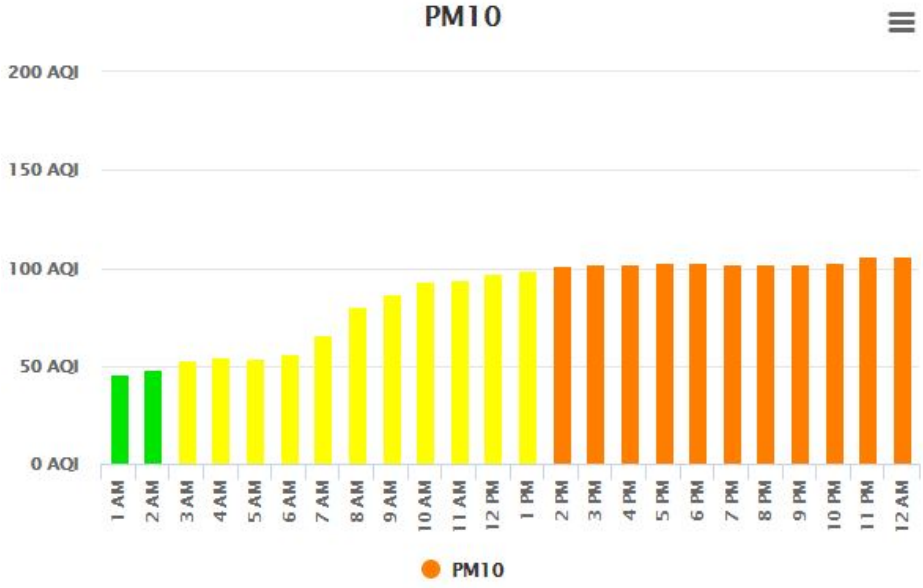


Fig 3-4: The degradation, or affect upon air quality, maybe determined when the AQI changes from a "Yellow" or a Moderate level to an "Orange" level or a level that is Unhealthy for sensitive groups

III.1 Summary of Forecasts and Warnings

Several Area Forecast Discussions were issued by the NWS offices in Phoenix and San Diego described the timeline and effects resulting from the movement of the deep trough into central California. As the trough moved inland surface pressure gradients strengthened producing gusty westerly winds within the San Diego Mountains. Because of the nature of the trough, slow moving without optimal temporal alignment of the synoptic weather features, neither NWS office issued Urgent Weather Messages. **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 May 25, 2018 different sites measured wind speeds at or above (and some far in excess of) 25mph.

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 4-4 show the time series of available FRM and BAM 24-hr PM_{10} concentrations at the Calexico and Brawley air quality monitors for the period of January 1, 2010 through May 25, 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 May 25, 2018, as measured by the Brawley and Calexico monitors, were used to establish the historical and seasonal variability over time.[19] All figures illustrate that the exceedance, which occurred on May 25, 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 MAY 25, 2018

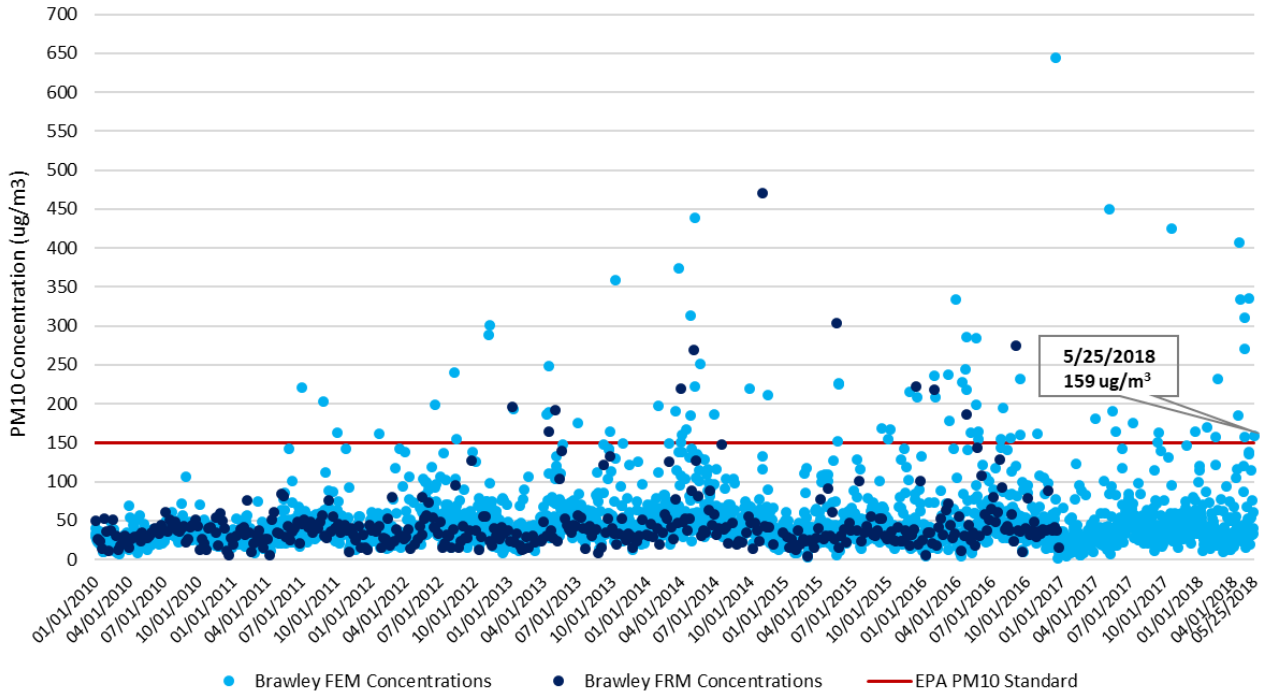


Fig 4-1: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 159 µg/m^3 on May 25, 2018 by the Brawley monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-1,** for Brawley includes 3,067 sampling days (January 1, 2010 through May 25, 2018). Of the 3,067 sampling days the Brawley monitor measured 78 exceedance days which translates into an occurrence rate less than 3%. Historically, there were fourteen (14) exceedance days measured during the first quarter; thirty-five (35) 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 MAY 25, 2018

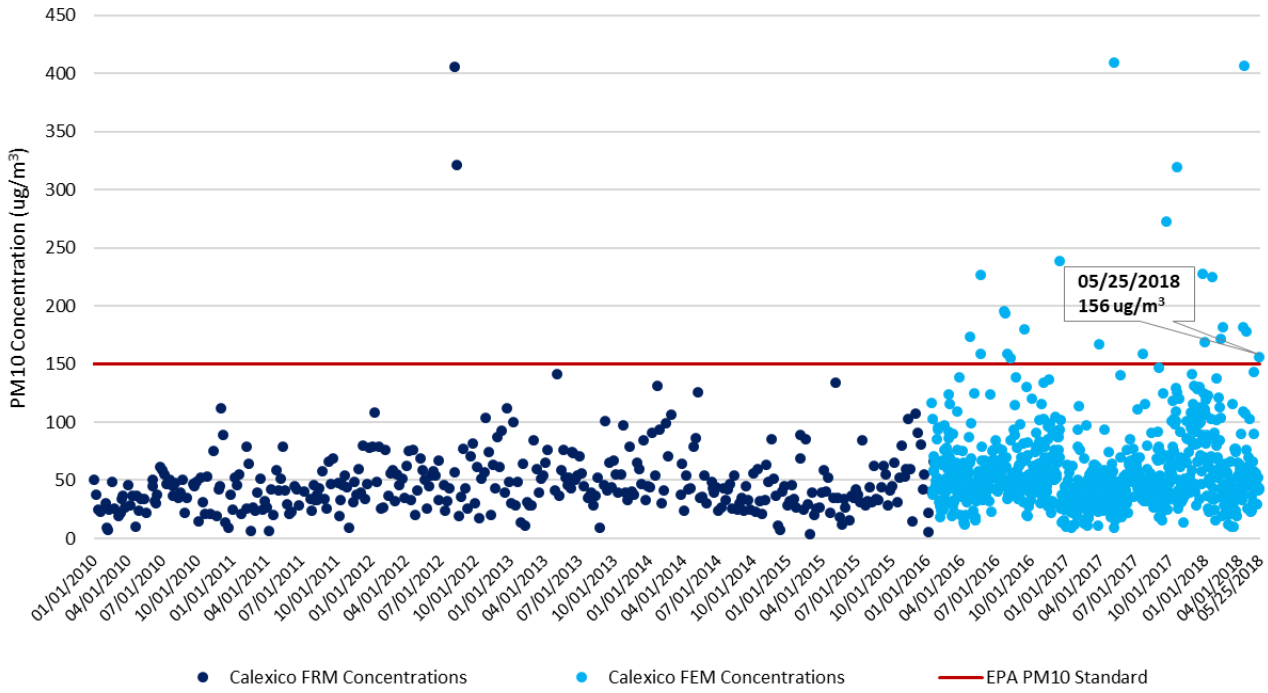
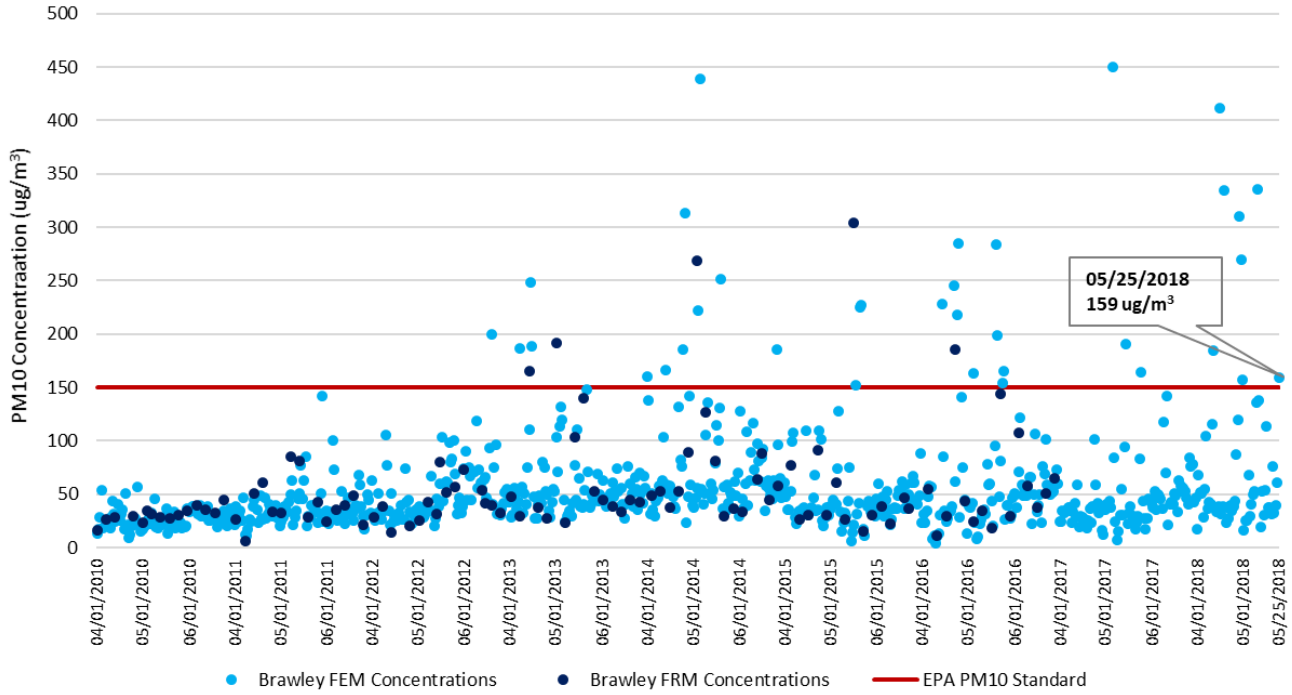


Fig 4-2: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 156 µg/m^3 on May 25, 2018 by the Calexico monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-2,** for Calexico includes 1,278 sampling days (January 1, 2010 through May 25, 2018). Of the 1,278 sampling days the Calexico monitor measured 25 exceedance days, which translates into an occurrence rate less than 2%. Historically, there were two (2) exceedance days measured during the first quarter; eight (8) exceedance days measured during the second quarter; nine (9) exceedance days measured during the third quarter; and three (3) exceedance days measured during the fourth quarter.

FIGURE 4-3
BRAWLEY SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***APRIL 1, 2010 TO MAY 25, 2018**

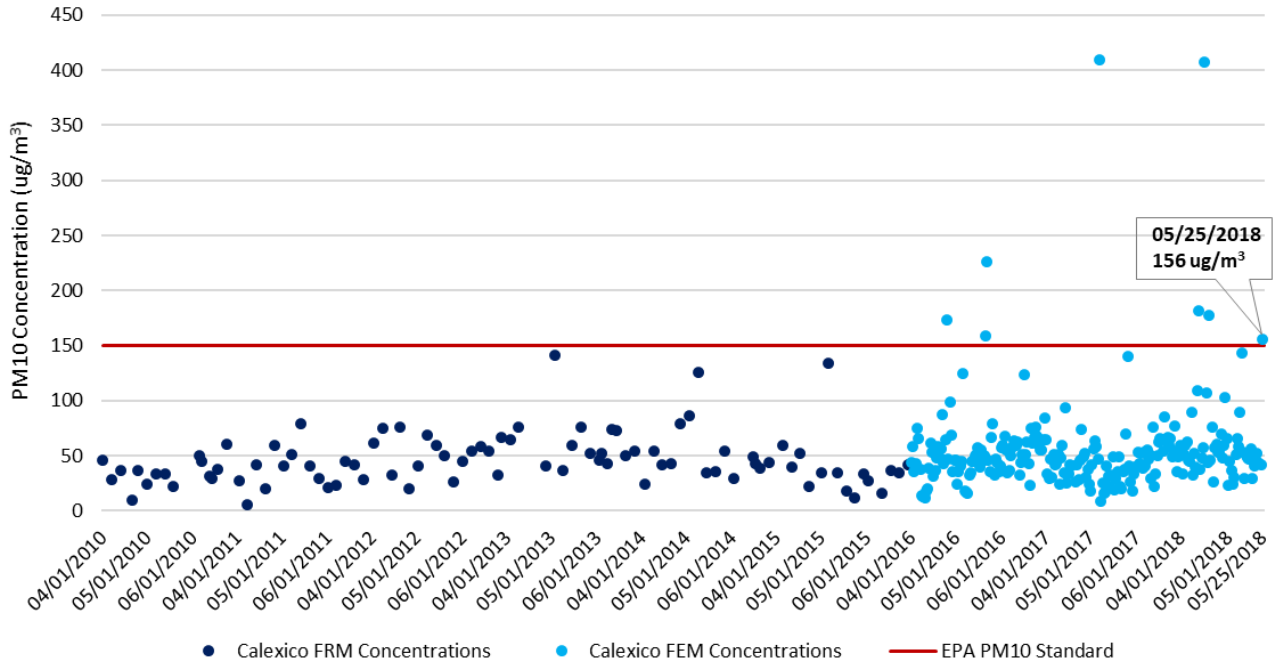


***Quarterly: April 1, 2010 to June 30, 2017 and April 1, 2018 to May 25, 2018**

Fig 4-3: A comparison of PM_{10} seasonal concentrations demonstrate that the measured concentration of 159 µg/m^3 by the Brawley monitor on May 25, 2018 was outside the normal seasonal concentrations when compared to similar days and non-event days

Figure 4-3 illustrates the seasonal fluctuations over a period of 783 sampling days, 886 credible samples and thirty-five (35) exceedance days. This translates to less than a 3.9% seasonal exceedance occurrence rate.

FIGURE 4-4
CALEXICO SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***APRIL 1, 2010 TO MAY 25, 2018**



***Quarterly: April 1, 2010 to June 30, 2017 and April 1, 2018 to May 25, 2018**
Fig 4-6: A comparison of PM_{10} seasonal concentrations demonstrate that the measured concentration of 156 µg/m^3 by the Calexico monitor on May 25, 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 340 sampling days, 327 credible samples and eight (8) exceedance days. This translates to less than a 2.4% seasonal exceedance occurrence rate.

Examining the historical and seasonal time series concentrations as they relate to the May 25, 2018 measured exceedances, the exceedances measured on May 25, 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. The origination of these emissions from these areas affected all the air quality monitors significantly on May 25, 2018. Since Imperial County does not have jurisdiction over emissions emanating from San Diego County, 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

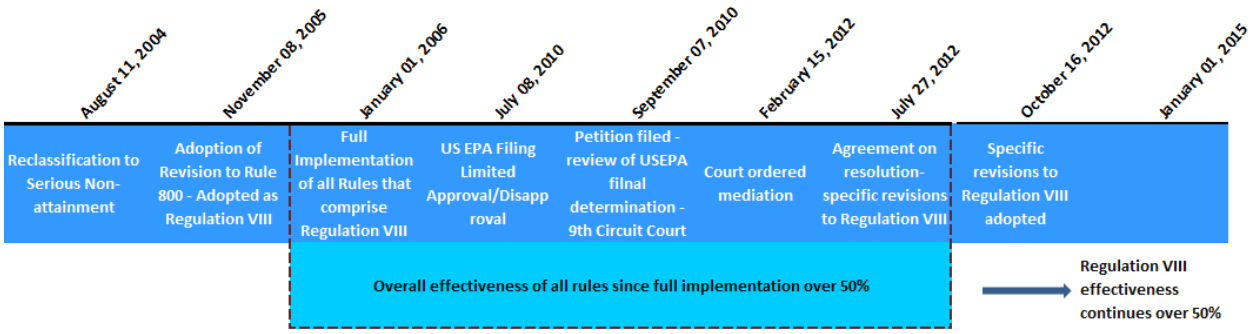


Fig 5-1: Regulation VIII Graphic Timeline

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 May 25, 2018 different sites measured wind speeds at or above 25 mph (in some cases far above 25 mph). Wind speeds of 25 mph are normally sufficient to overcome most PM_{10} control measures. During the May 25, 2018 event, wind speeds were above the 25 mph threshold, overcoming reasonable controls 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 and Calexico monitors during the May 25, 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

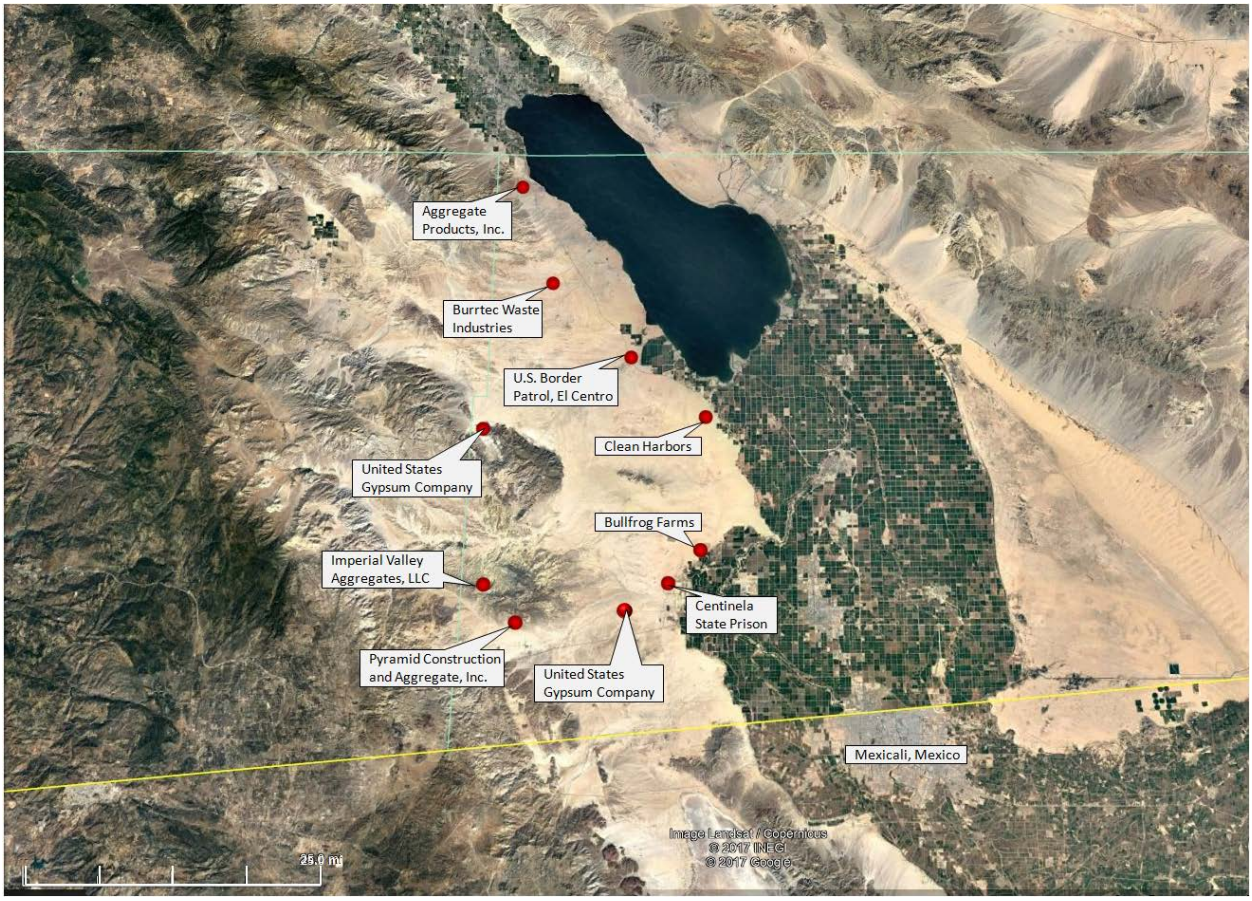


Fig 5-2: The above map identifies those permitted sources located west, northwest and southwest of the Brawley and Calexico monitors. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the 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

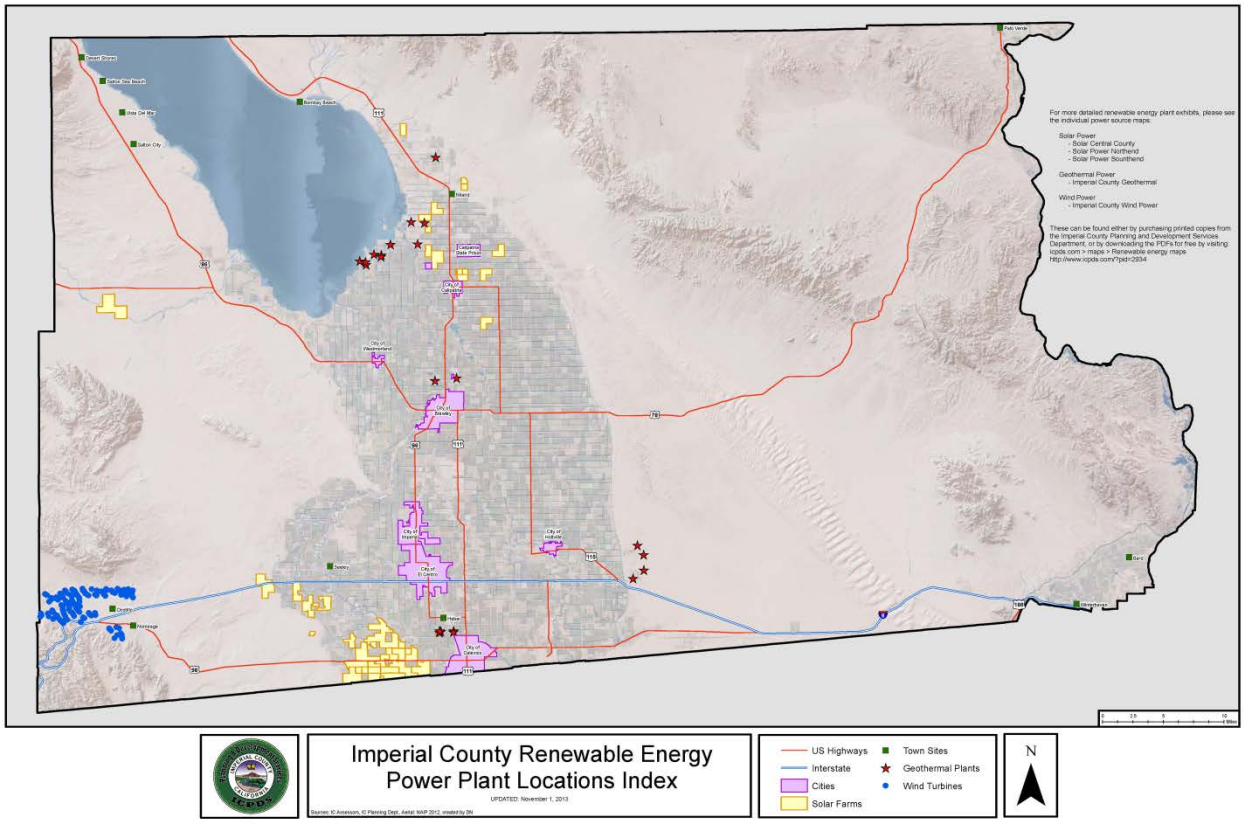


Fig 5-3: The above map identifies those power sources located west, northwest and southwest of the Brawley and Calexico monitors. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

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 May 25, 2018 resulted from what the NWS identified as a deep trough that strengthened the onshore surface pressure gradient and generated strong gusty westerly winds across and over the San Diego Mountains and into Imperial County. The westerly flow over the San Diego mountains promoted stronger downslope winds into the western section of Imperial County.[20] Because the trough was not forecasted to create widespread and dense blowing dust neither office issued Urgent Weather Messages for the event.[21] While reduced visibility was reported by some of the airports none of the local airports identified blowing dust. Still, NOAA's Satellite Smoke Text Product described "[r]ather subtle areas of blowing dust…resulting from locally strong gusty winds over…southern California near and south of the Salton Sea…"(**Appendix C**).

Strong gusty westerly winds blew over the San Diego Mountains, through slopes down into the natural open desert floor transporting dust onto the air quality monitors in Westmorland, Brawley, El Centro, Niland and Calexico. As a consequence, all air quality monitors in Imperial County measured 24-hr averaged PM_{10} concentrations above 100 $\mu g/m^3$, but only the Calexico and Brawley monitors exceeded the NAAQS by 1 $\mu g/m^3$ and 4 $\mu g/m^3$, respectively. Because winds were strongest along the southwestern portion of Imperial County, the Calexico monitor and the Brawley monitor were much more exposed to the downslope winds off the San Diego Mountains. Niland was too far within the eastern section of Imperial County, Westmorland was similarly farther inland and further north and finally El Centro is much more sheltered by urbanization.

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 May 25, 2018 event, which changed or affected air quality in Imperial County.

[20] National Weather Service, Area Forecast Discussion, May 24, 2018, Phoenix office, 130pm MST
[21] National Weather Service, Area Forecast Discussion, May 24, 2018, Phoenix office, 130pm MST

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 reasonable controls, 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 where Imperial County has no jurisdiction. In any event, despite reasonable controls in place within Imperial County, high winds overwhelmed all reasonable controls where human activity played little to no direct causal role. The PM_{10} exceedance measured at the Brawley 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 and Calexico monitors on May 25, 2018, were 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 and Calexico monitors on May 25, 2018, were caused by the transport of windblown dust into Imperial County by strong gusty westerly winds associated with a low-pressure system that passed through the region. At the time of the event, anthropogenic sources, within Imperial County were reasonably controlled. 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 and Calexico monitors in Imperial County demonstrates a consistency of elevated gusty westerly winds with elevated concentrations of PM_{10} on May 25, 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 May 25, 2018.

VI.5 Concentration to Concentration Analysis

The historical annual and seasonal 24-hr average PM_{10} measured concentrations at the Brawley 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 the identified deep trough 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 and Calexico air quality monitors in Imperial County on May 25, 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 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.[22]

[22] 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.