

IMPERIAL COUNTY AIR POLLUTION CONTROL DISTRICT

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December 20, 2017 Exceptional Event Documentation For the Imperial County PM₁₀ Nonattainment Area

An exceedance of the National Ambient Air Quality Standard (NAAQS) for PM₁₀ at the Brawley and Westmorland monitors in Imperial County, California on December 20, 2017

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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		DOCUMENT SECTION
TITLE 40 CFR §50.14(c)(3)(iv) CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM₁₀)		
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 28
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	Pg 31
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 36

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		DOCUMENT SECTION
EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM₁₀)		
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 (PM₁₀) 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 PM₁₀. It is important to note that the use of non-regulatory data within this document, typically continuous PM₁₀ 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 December 20, 2017, 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. December 18, 2017 through December 20, 2017, 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 by Wednesday, December 20, 2017. The ICAPCD advisory provided a description of the advisory level winds affecting eastern Riverside County and parts of Imperial County. **Appendix C** contains copies of notices pertinent to the December 20, 2017 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 December 20, 2017, a naturally occurring event elevated particulate matter within San Diego, Riverside and Imperial counties, causing an exceedance at the Brawley (06-025-0007) and Westmorland (06-025-4003) 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 PM₁₀ hourly concentrations from the Brawley and Westmorland monitors on December 20, 2017. After review, CARB submitted the INPEE, for the December 20, 2017 event in July of 2017. The submitted request included a brief description of the meteorological conditions for December 20, 2017 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.

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

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 December 20, 2017 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 158 $\mu\text{g}/\text{m}^3$ measured by the Brawley monitor and 169 $\mu\text{g}/\text{m}^3$ measured by the Westmorland monitor on December 20, 2017.
- (B)** Concurrently with the Public Review period for the December 20, 2017 exceptional event, the ICAPCD is formally submitting to CARB for remittance to USEPA the Draft December 20, 2017 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 2017 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 Geronio 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**

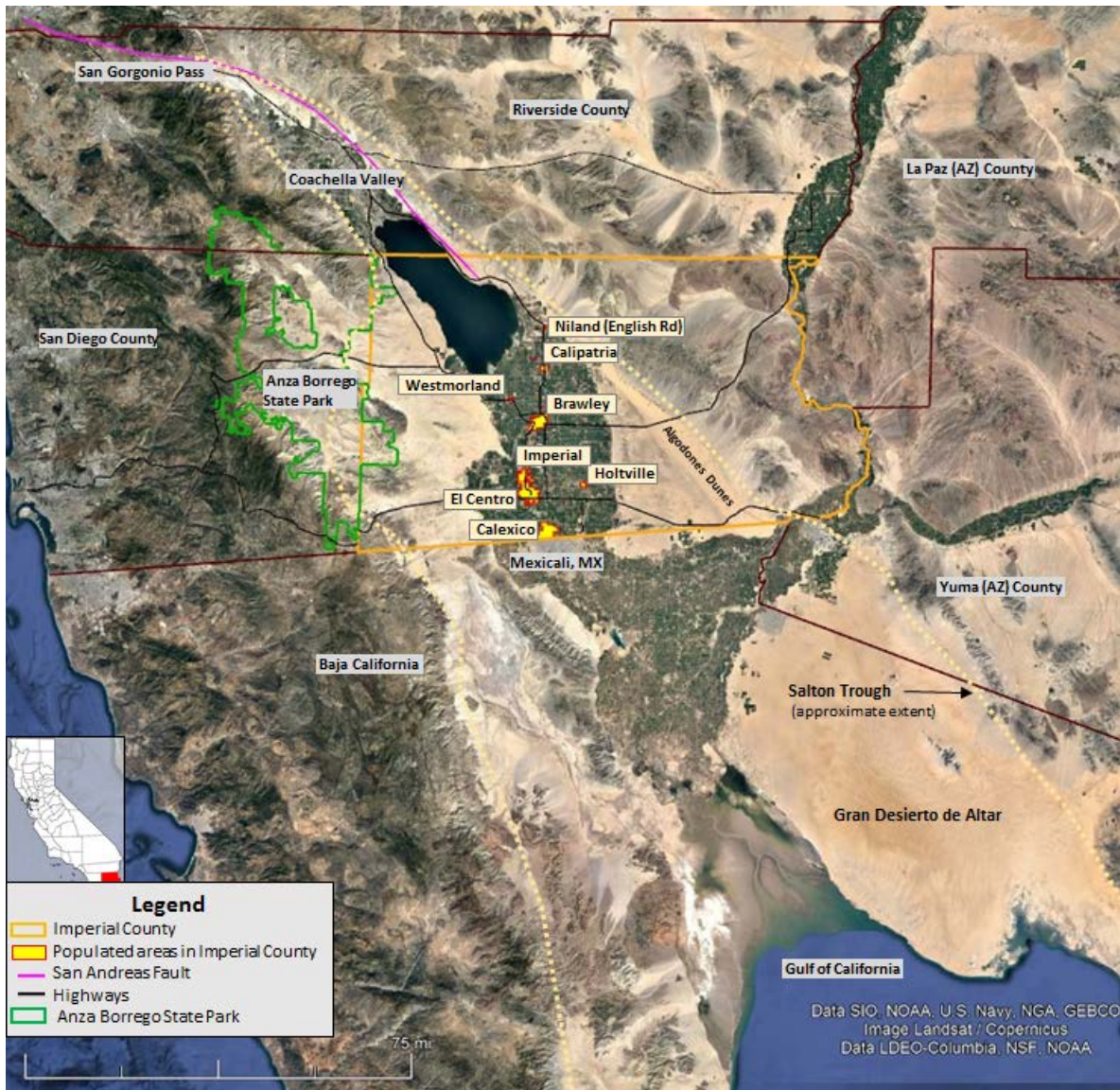


Fig 1-1: Imperial County a Southern California border region, within far southeast California bordering Arizona and Mexico has a small economically diverse region with a population of 174,528

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 PM₁₀ 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 PM₁₀ 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 monitor

II.1 Description of the event causing the exceedance

Days before and during Wednesday, December 20, 2017, the NWS offices in Phoenix and San Diego issued Area Forecast Discussions describing a trough, digging southeast into Nevada, "...dragging a cold front across..." the region by Wednesday, December 20, 2017.⁴ Because winds were expected to reach advisory level wind speeds along the southeastern portion of Riverside, just north of Imperial County, the Phoenix NWS office issued the first Urgent Weather Message December 19, 2017.⁵ The San Diego NWS, acknowledged the need for a wind and blowing dust advisory for Wednesday, December 20, 2017 and identified the potential for reduced visibility along Interstates 8, 10, and 15 through the mountains and down into the deserts.⁶ The actual advisory was not issued by the San Diego NWS office until late afternoon, December 19, 2017. A total of eight (8) Urgent Weather Messages were issued by either the San Diego or Phoenix NWS office advising of advisory level winds within the San Diego County Mountains and deserts and Imperial County.⁷

The potential unfolding of the event was best described by the Phoenix office in its Area Forecast Discussion when it described that the southwest was "... in between storm systems..." as the first upper disturbance moved into the "...southern High Plains, and another more potent upper trough..." would bring significant cooling and advisory level winds into the region, specifically affecting eastern Riverside County and parts of Imperial County.⁸ **Appendix A** contains all pertinent NWS notices.

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

On December 20, 2017, the air monitors in Imperial, Riverside and Yuma counties measured elevated concentrations of particulate matter when a passing low-pressure system with an associated cold front brought gusty westerly winds across southeastern California and western Arizona. The preceding winds ahead of the fast-moving cold front brought west-southwesterly moderate winds during the early hours of Wednesday, December 20, 2017 along the mountains and deserts west of Imperial County. However,

⁴ National Weather Service, Area Forecast Discussion, Dec., 19, 2017, San Diego office, 741am PST

⁵ National Weather Service, Urgent Weather Message, Dec., 19, 2017, Phoenix office, 341am MST

⁶ National Weather Service, Urgent Weather Message, Dec., 19, 2017, San Diego office, 513pm PST

⁷ National Weather Service, Urgent Weather Messages, Dec., 19, 2017 to Dec., 21, 2017, San Diego and Phoenix NWS offices, 341am MST; 316pm MST; 513pm PST; 245am PST; 222pm PST; 721pm PST; 1152pm PST and 1216am PST

⁸ National Weather Service, Area Forecast Discussion, Phoenix office, 334am MST

the stronger gustier westerly winds occurred during the afternoon hours as winds shifted to the west during the late evening hours of December 20, 2017.⁹ These stronger gusty westerly winds generated emissions from within the open mountain ranges and surrounding open natural deserts within San Diego County and Imperial County. These windblown emissions were transported into Imperial County causing an exceedance of the PM₁₀ NAAQS at the Westmorland and Brawley 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 Mexico and the site furthest north is the Palm Springs Fire Station

⁹ National Weather Service, Area Forecast Discussion, Dec., 20, 2017, Phoenix office, 244pm MST

**TABLE 2-1
HOURLY CONCENTRATIONS OF PARTICULATE MATTER**

		000	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Hrly MAX	24-Hr AVERAGE
PS FIRE STATION	20171219	22	18	16	17	19	13	16	35	50	21	16	13	15	14	20	22	21	21	22	22	20	18	21	16	50	20
	20171220	13	12	11	11	14	15	16	24	36	28	31	27	24	33	28	29	31	37	40	73	160	120	106	49	160	40
	20171221	46	43	31	15	13	11	5	9	16	10	75	19	12	28	13	14	14	12	10	17	15	15	17	19	75	19
INDIO	20171219	25	21	18	19	19	21	26	49	55	40	27	22	34	20	48	16	26	40	70	74	51	29	35	31	74	34
	20171220	21	17	22	22	20	25	38	60	64	43	30	23	15	28	34	64	91	78	76	96	201	118	47	129	201	56
	20171221	75	33	37	22	27	16	11	14	18	14	15	33	97	161	108	16	48	34	13	13	18	17	19	21	161	36
MECCA	20171219	12	12	9	9	8	15	18	63	64	30	30	22	17	20	16	18	49	37	44	77	42	24	14	12	77	27
	20171220	14	12	14	17	17	34	32	63	95	38	19	51	33	11	33	37	35	45	44	415	85	240	98	106	415	66
	20171221	109	63	37	32	19	36	64	53	48	137	76	201	106	273	85	35	30	40	28	25	25	22	15	13	273	65
TORRES MARTINEZ	20171219	26	27	27	20	18	15	85	37	34	27	18	25	23	23	28	49	43	46	32	50	17	20	27	19	85	30
	20171220	23	25	16	16	14	15	35	57	40	72	30	26	28	30	50	71	59	87	75	1199	149	165	180	86	1199	106
	20171221	76	57	104	101	111	260	50	21	59	99	208	55	70	629	188	43	98	56	16	17	13	11	17	23	629	99
WESTMORLAND	20171219	28	28	20	14	14	18	25	44	55	23	33	36	36	51	50	64	70	93	84	123	69	66	58	55	123	48
	20171220	53	46	41	33	39	46	56	63	44	48	119	48	59	57	61	79	86	75	163	995	438	775	181	452	995	169
	20171221	162	115	96	47	35	17	107	96	149	104	186	521	53	29	99	52	48	29	21	29	23	17	17	8	521	85
BRAWLEY	20171219	32	40	34	30	23	36	41	62	46	36	52	38	42	60	39	55	83	131	152	93	80	82	82	69	152	59
	20171220	54	37	41	44	54	73	74	73	103	57	60	34	43	62	64	78	93	89	104	995	256	576	307	437	995	158
	20171221	163	112	85	34	21	19	61	71	205	155	140	194	79	35	57	37	42	40	43	62	23	30	17	18	205	72
NILAND	20171219	17	10	15	32	15	25	15	34	36	59	62	52	32	41	69	55	41	53	64	45	34	31	28	31	69	37
	20171220	34	34	32	24	24	29	16	26	23	41	59	105	52	52	56	59	66	74	94	496	307	242	618	142	618	112
	20171221	108	97	45	40	15	11	8	7	9	42	33	86	67	36	22	21	20	13	64	31	8	27	15	108	35	
EL CENTRO	20171219	48	23	23	14	15	22	25	54	51	41	60	59	45	54	121	89	115	116	140	171	174	163	144	107	174	78
	20171220	101	79	76	70	63	73	91	102	101	100	108	91	85	89	71	86	103	109	81	563	196	122	409	103	563	128
	20171221	318	147	115	60	34	33	18	47	68	217	66	91	55	22	25	35	46	35	40	40	30	35	20	13	318	67
CALEXICO	20171219	183	168	140	126	146	169	194	246	83	71	75	71	91	104	70	70	90	136	166	187	156	136	123	142	246	130
	20171220	154	126	110	93	107	137	183	195	173	128	81	86	76	71	58	52	67	66	65	55	127	384	91	29	384	113
	20171221	273	208	97	84	44	23	30	48	46	236	144	164	110	70	25	65	51	56	63	46	118	201	99	103	273	100
YUMA SUPERSITE (PST)	20171219	116	30	47	78	35	59	55	52	62	53	57	91	41	28	45	36	33	68	69	75	61	74	17	84	116	56
	20171220	79	63	53	33	25	25	88	158	124	92	85	17	27	20	20	16	24	20	23	11	24	25	36	113	158	50
	20171221	313	252	124	97	206	46	92	55	23	42	111	233	58	83	63	27	29	39	30	30	31	20	31	313	88	
YUMA SUPERSITE (MST)	20171218	11	8	7	8	13	8	27	39	42	51	23	42	33	13	24	23	33	38	63	42	74	51	53	59	74	32
	20171219	90	116	30	47	78	35	59	55	52	62	53	57	91	41	28	45	36	33	68	69	75	61	74	17	116	57
	20171220	84	79	63	53	33	25	25	88	158	124	92	85	17	27	20	16	24	20	23	11	24	25	36	158	48	
	20171221	113	313	252	124	97	206	46	92	55	23	42	111	233	58	83	63	27	29	39	30	30	31	20	313	92	
20171222	31	23	35	24	51	36	127	41	63	23	28	38	29	13	20	23	62	38	55	33	96	48	69	75	127	45	

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/m³. **Pink squares** around concentrations identify peak hourly concentrations

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

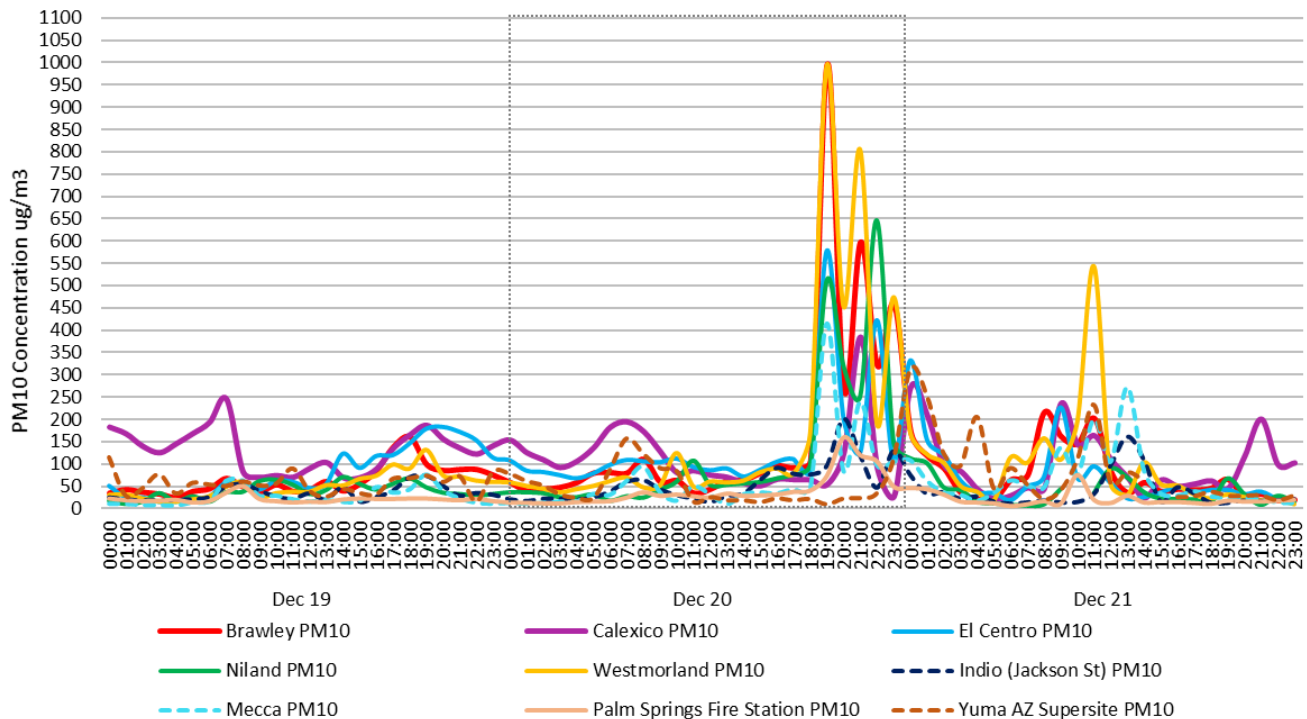


Fig 2-2: is a three-day graphical representation of the PM₁₀ concentrations measured at the sites identified in **Table 2-1**. Note all monitors measuring elevated concentrations during the evening hours

Wind speed, wind direction and the airflow patterns combined all help to explain how windblown emissions resulting from the gusty westerly winds generated by the passing of the low-pressure system and associated cold front affected the Brawley and Westmorland monitors on Wednesday, December 20, 2017. The preceding winds ahead of the fast-moving cold front brought west-southwesterly moderate winds during the early hours of Wednesday, December 20, 2017 however, as the cold front passed through, a shift of wind direct to the west, allowed for more significant strengthening of the gusty westerly winds during the late evening hours of December 20, 2017.¹⁰ As mentioned above, eight (8) Urgent Weather Messages were issued by the NWS offices in San Diego and Phoenix advising of advisory level westerly winds within San Diego County, eastern Riverside 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 and Yuma counties measured wind speeds at or above 25 mph or measured wind gusts at or above 25 mph. Locations farther

¹⁰ National Weather Service, Area Forecast Discussion, Dec., 20, 2017, Phoenix office, 244pm MST

west such as Mountain Springs Grade on the desert slopes on the western edge of Imperial County measured elevated wind speeds sooner than sites farther east coincident with measured elevated concentrations.

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

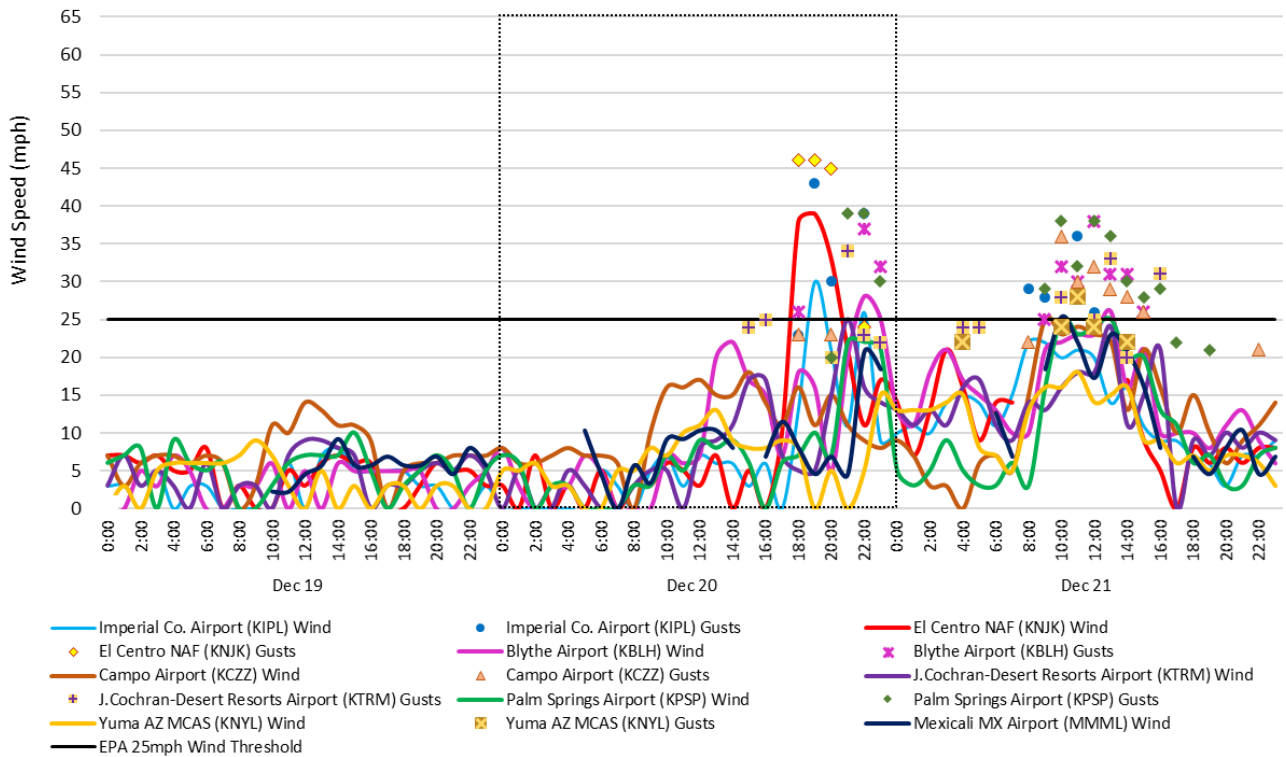


Fig 2-3: is a three-day graphical representation of the measured wind speed and wind gust (if available) from local and neighboring airports. Note the elevated wind speeds are consistent for sites with minor variations. All data derived from the Local Climatological Data Hourly Observations (LCDHO) reports released by the NOAA <https://www.ncdc.noaa.gov/>

FIGURE 2-4
WIND SPEEDS AND GUST UPSTREAM SITES

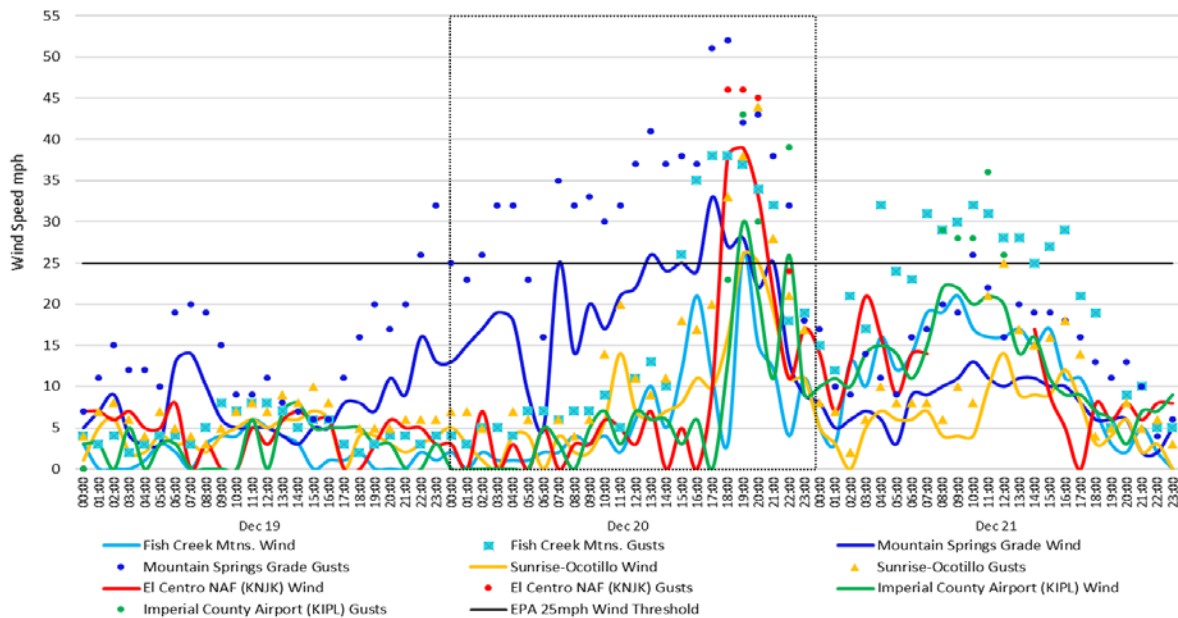


Fig 2-4: is a three-day graphical representation of the measured wind speed and wind gust (if available) from sites located upwind from the Brawley and Westmorland monitors. Wind data for KIPL and KNJK from Local Climatological Data Hourly Observations (LCDHO) reports released by the NOAA. All other 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 models¹¹ provide supporting evidence of the occurrence of a shift in airflow that brought about strong evening gusty westerly winds on December 20, 2017.¹² The HYSPLIT back-trajectory models in **Figure 2-5** and **Figure 2-6** depict airflow during the late evening, 1900 PST, coincident with the hourly peak measured concentration at most air quality monitors, and the dawn hours of the following day (0200 PST) when measured concentrations reduced. According to the NWS the late evening airflow shift to the west caused a strengthening of winds speeds prompting the blowing dust advisories in addition to the wind advisories.¹³

¹¹ 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. Used, currently, 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.

¹² National Weather Service, Area Forecast Discussion, Dec., 20, 2017, Phoenix office, 244pm MST

¹³ National Weather Service, Urgent Weather Message, Dec., 20, 2017, Phoenix office, 721pm MST

FIGURE 2-5
HYSPLIT MODEL ALL SITES DECEMBER 20, 2017 1900 PST

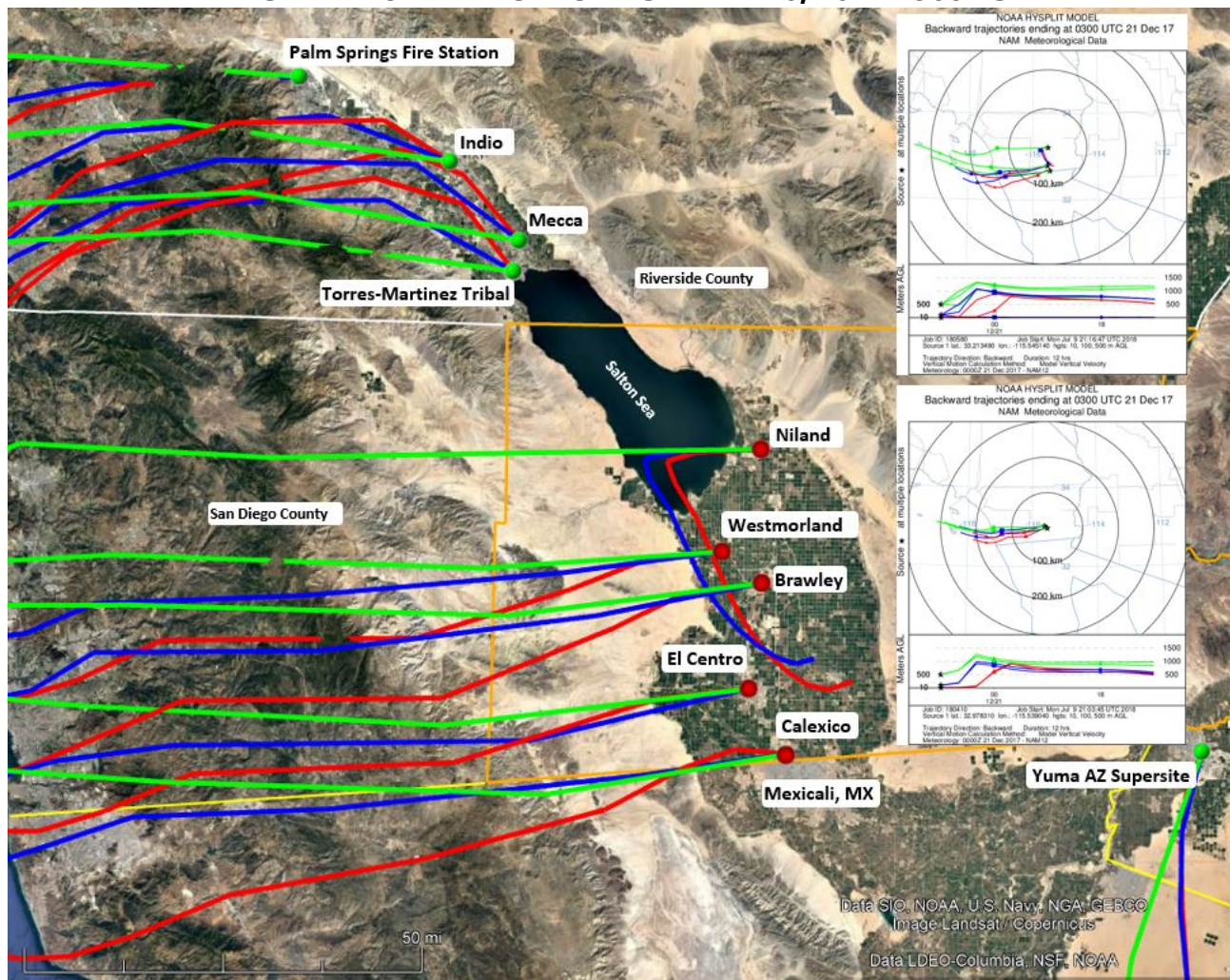


Fig 2-5: A 12-hour back-trajectory ending at 1900 PST for all sites identified in **Table 2-1**. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA’s Air Resources Laboratory HYSPLIT model. Base map from Google Earth

FIGURE 2-6
HYSPLIT MODEL IMPERIAL COUNTY SITES DECEMBER 21, 2017 0200 PST

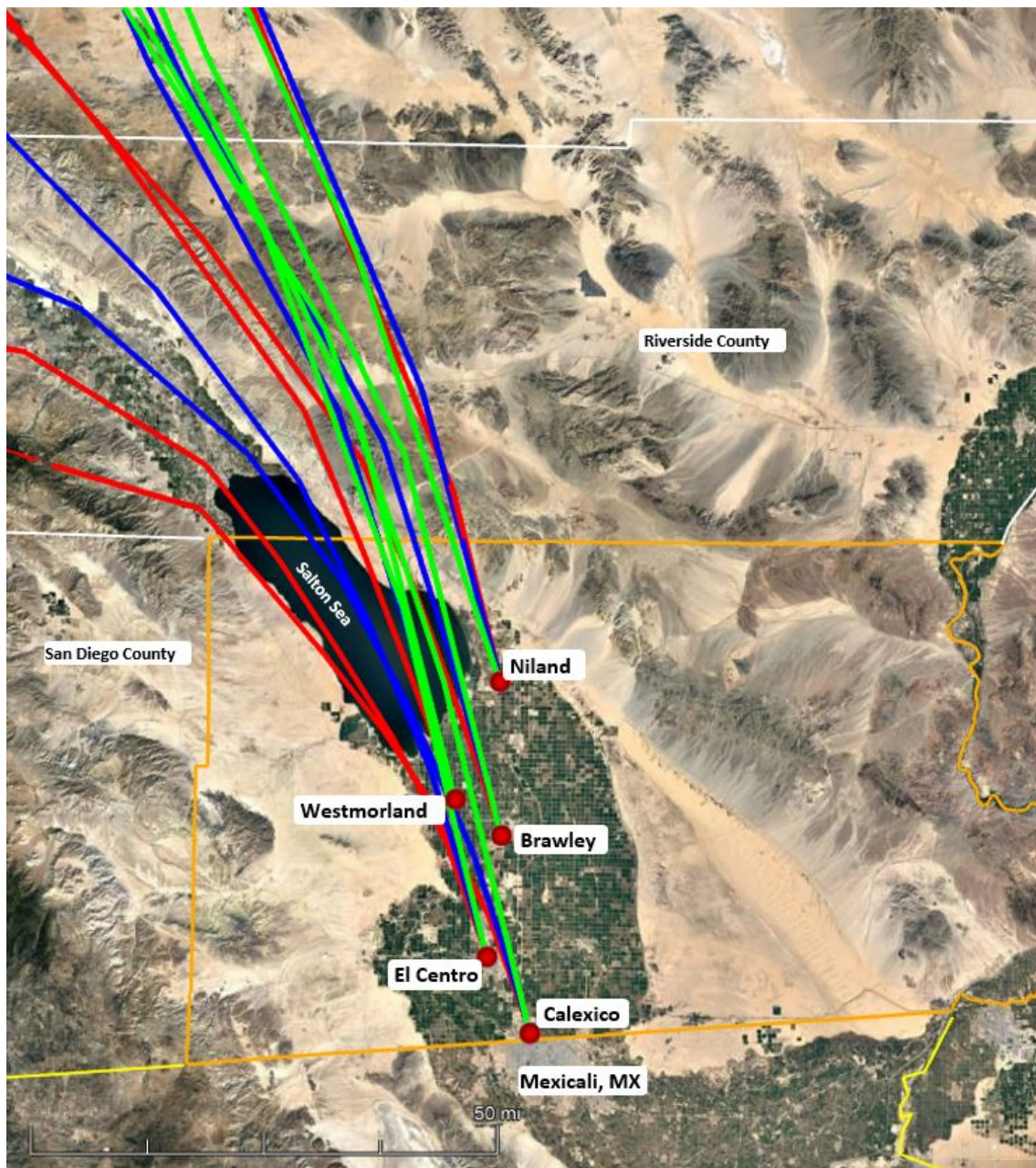


Fig 2-6: A 24-hour back trajectory ending at 0200 PST is coincident with reduced measured concentrations. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

As strong gusty westerly winds blew over open natural mountains and desert areas west of Imperial County, fugitive windblown dust affected all air quality monitors in Imperial County. In anticipation to the gusty westerly winds, both the NWS offices in San Diego and Phoenix, issued wind advisories, in total eight (8) Urgent Weather Messages were issued. However, as it became evident that winds would significantly increase during the afternoon to evening hours both NWS office began addressing blowing dust and reduced visibility. The Imperial County Airport (KIPL) and the El Centro Naval Air Facility (KNJK) measured winds in excess of 25 mph with peak wind speed and gusts measured during the evening hours. KIPL measured 30 mph peak winds and peak gusts of 43 mph during the evening hours while KNJK measured 39 mph maximum winds and peak gust of 46 mph. Mountain Springs Grade (elev. 2,044 ft.) along the desert slopes and Sunrise-Ocotillo (elev. 695 ft.) near the desert floor both had measured winds in excess of 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 trough and associated cold front moved southeast into Nevada brought gusty westerly winds on Wednesday, December 20, 2017. As the trough moved southeast onshore surface pressure gradients strengthened creating gusty westerly winds across the mountains and deserts. Winds remained moderate, as the cold front entered southeast California during the early morning hours of December 20, 2017. However, as the cold front moved eastward during the evening hours winds increased significantly.¹⁴ Advisory level winds were expected along the southeastern portion of Riverside, Imperial County and along Interstates 8, 10, and 15 through the mountains and down into the deserts.¹⁵

While elevated wind speeds play a significant and important role in the transportation of dust, gusts play an equally significant role in deposition of particulates onto a monitor and the overall affect onto ambient air.¹⁶ Elevated strong afternoon and evening gusty westerly winds generated and transported windblown dust from outlying open natural mountains and deserts into Imperial County causing air quality to degrade. 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, both NWS office, in San Diego and Phoenix issued Urgent Weather Messages advising of advisory level winds and blowing dust within the San Diego County Mountains and deserts and Imperial County (**Appendix A**).¹⁷ Blowing dust was confirmed within the region by the descriptive text narrative issued by NOAA's Satellite Services Division which identified "...[n]umerous origins of blowing dust... in western San Bernardino County...and...west of the Salton Sea in San Diego County, CA....." The narrative explained that the dust was "...streaming east as far as the border with Arizona and Nevada through sunset..." (**Appendix C**).

Figure 3-1 below provides an illustration of some of the meteorological conditions, as described above and demonstrated in the HYSPLITS, for December 20, 2017, which affected air quality in Imperial County. As the cold front entered southeast California winds remained moderate through the morning hours of December 20, 2017, however, as the cold front moved further inland during the evening hours, winds significantly

¹⁴ National Weather Service, Area Forecast Discussion, Dec., 20, 2017, Phoenix office, 244pm MST

¹⁵ National Weather Service, Urgent Weather Message, Dec., 19, 2017, San Diego office, 513pm PST

¹⁶ 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>

¹⁷ National Weather Service, Urgent Weather Messages, Dec., 19, 2017 to Dec., 21, 2017, San Diego and Phoenix NWS offices, 341am MST; 316pm MST; 513pm PST; 245am PST; 222pm PST; 721pm PST; 1152pm PST and 1216am PST

increased generating fugitive emissions within the San Diego Mountains and slopes onto the desert floor of Imperial County. Although all of the air quality monitors in Imperial County measured 24-hour PM₁₀ averages above 100 µg/m³, only the Brawley and Westmorland monitors exceeded the NAAQS by 3 µg/m³ and 14 µg/m³, respectively.

FIGURE 3-1
RAMP-UP ANALYSIS AS DISCUSSED FOR DECEMBER 20, 2017

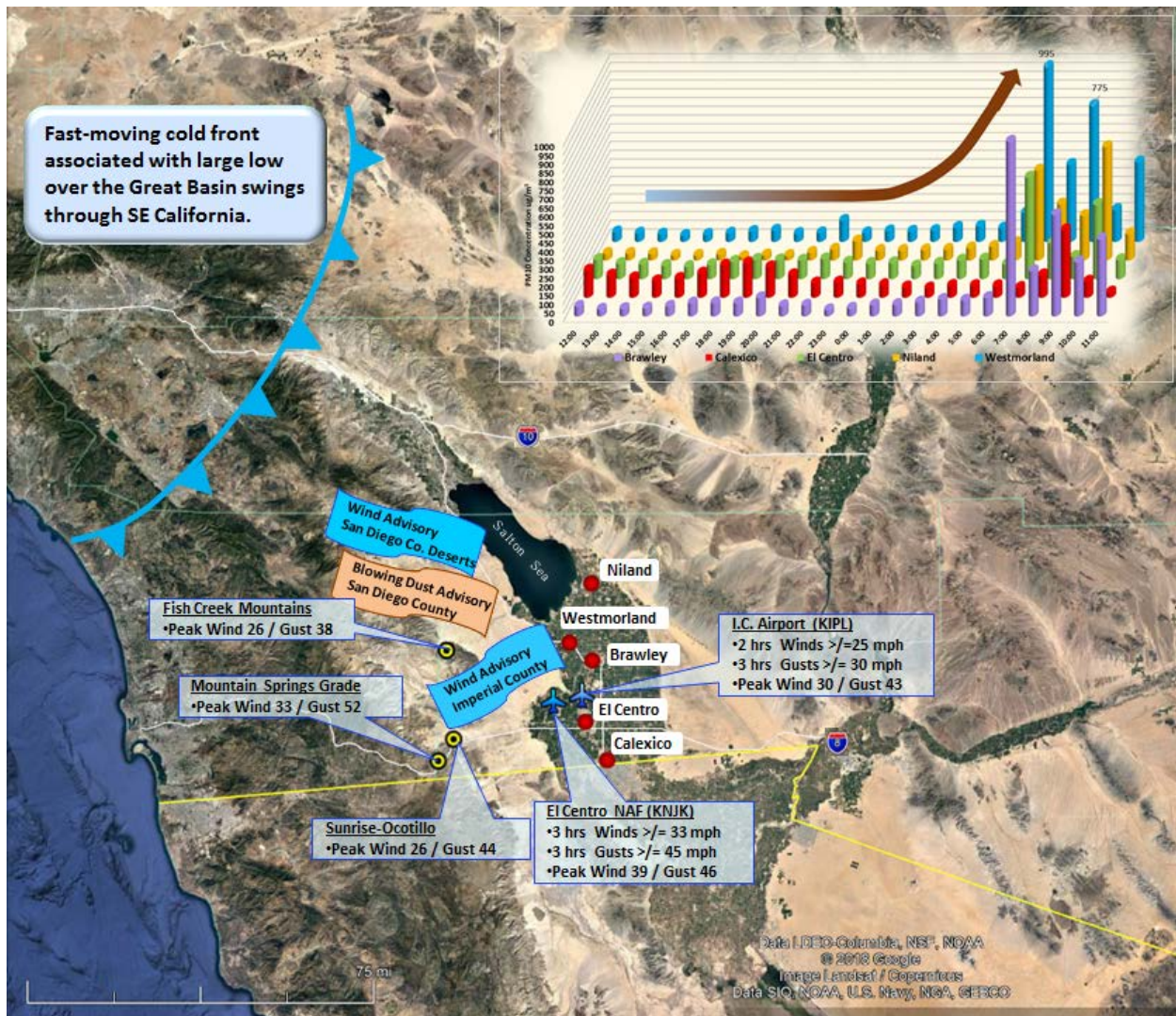


Fig 3-1: Upwind locations west of Imperial County measured strong gusty winds and gusts coincident with elevated hourly PM₁₀ concentrations at air quality monitors. Air quality data is from the EPA’s AQS data bank. Google Earth base map

An indicator of the affect 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.¹⁸

The Imperial County Airport (KIPL), and the El Centro Naval Air Facility (KNJK) 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 **Table 3-1** provides information regarding the reduced visibility in Imperial 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, **Table 3-1** provides a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM₁₀ concentrations at the Brawley and Westmorland monitors. Together, the data provides the supporting relationship between the elevated winds and reduced visibility.

According to the compiled information found in **Figure 3-2**, visibility reduced at both of the local airports, the El Centro NAF (KNJK), and the Imperial County Airport (KIPL) throughout the day but significantly reduced visibility was coincident with the elevated wind speeds and hourly concentrations at the air quality monitors in Imperial County.

¹⁸ 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 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>

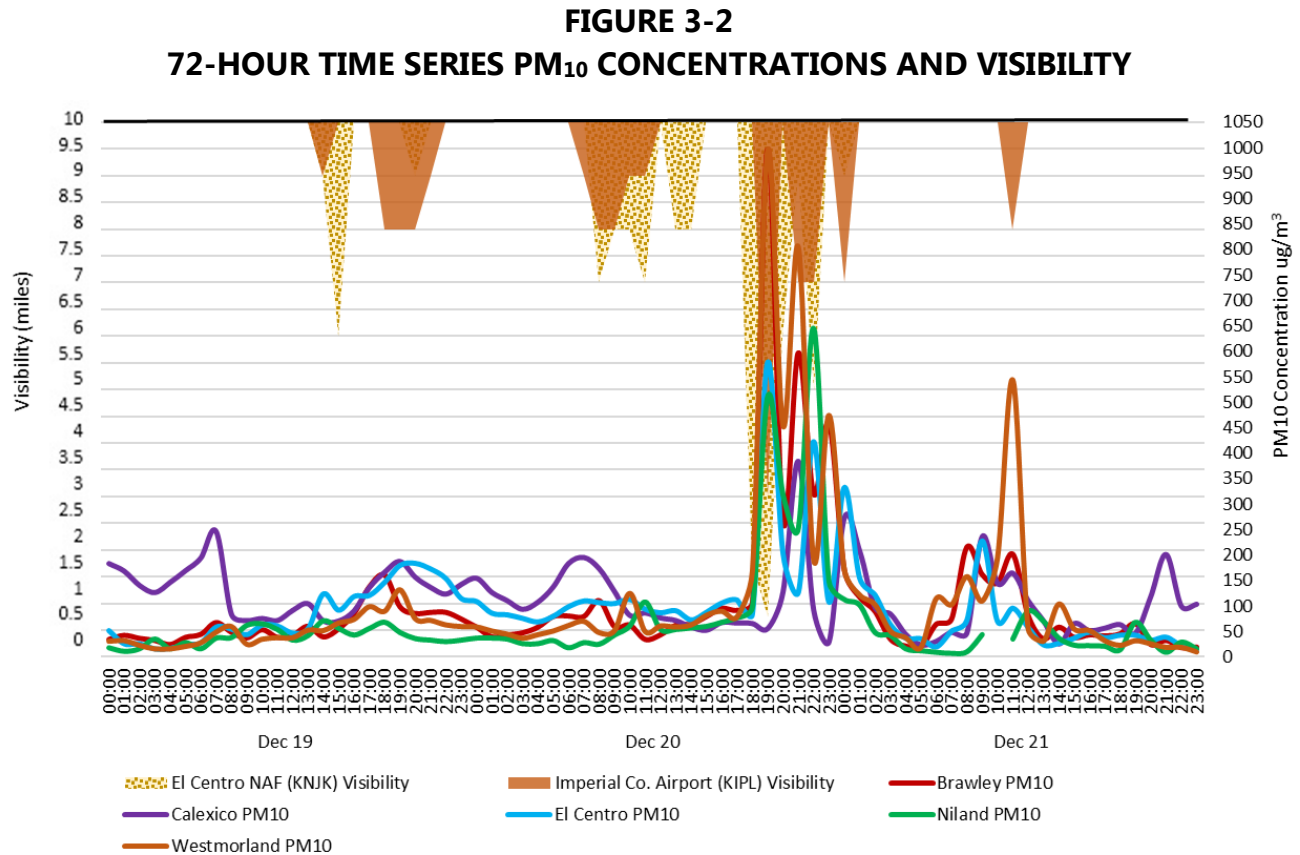


Fig 3-2: is a graphical representation of the compiled data from Imperial County Airport (KIPL) and El Centro NAF (KNJK). Reported reduced visibility is coincident with elevated winds and hourly levels of concentrations either just prior to peak concentrations or after. Visibility data from the NCEI’s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

Because the EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states¹⁹ **Table 3-1** is provided in support of the relationship between the elevated winds and elevated concentrations. In the table the measured elevated concentrations of PM₁₀ either follow or occur during periods of elevated winds or gusts. The table has a select group of meteorological sites that compare the hourly winds with the closest measured hourly concentration at all air quality monitors.

¹⁹ "Treatment of Data Influenced by Exceptional Events; Final Guidance", FR Vol. 81, No. 191, 68279, October 3, 2016

**TABLE 3-1
WIND SPEEDS AND BRAWLEY PM₁₀ CONCENTRATIONS DECEMBER 20, 2017**

HOUR	MOUNTAIN SPRINGS GRADE (TNSC1)			EL CENTRO NAF (KNJK)			IMPERIAL COUNTY AIRPORT (KIPL)			FISH CREEK MTNS. (FHCC1)			BRLY	CX	EC	NLND	WSTMLD
	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	W/S	W/G	W/D	PM ₁₀ (µg/m ³)	PM ₁₀ (µg/m ³)	PM ₁₀ (µg/m ³)	PM ₁₀ (µg/m ³)	PM ₁₀ (µg/m ³)
00:00	13	25	200	3		40	0		0	2	4	188	59	154	108	37	58
01:00	15	23	208	0		0	0		0	0	3		40	126	85	37	50
02:00	17	26	216	7		250	0		0	2	5	173	44	110	82	35	44
03:00	19	32	224	0		0	0		0	1	5	176	48	93	75	26	36
04:00	18	32	213	3		290	0		0	1	4	206	59	107	68	26	43
05:00	9	23	227	0		0	0		0	1	7	227	80	137	79	32	50
06:00	5	16	49	5		200	5		180	2	7	240	81	183	98	18	61
07:00	25	35	237	0		0	3		140	2	6	87	80	195	109	28	69
08:00	14	32	238	3		150	0		0	4	7	303	111	173	106	25	47
09:00	20	33	241	3		VRB	5		110	3	7	316	60	128	104	43	51
10:00	17	30	227	6		140	7		160	4	9	314	63	81	112	61	124
11:00	21	32	243	5		60	3		190	2	5	349	35	86	93	108	49
12:00	22	37	230	3		130	7		120	6	11	297	44	76	86	54	60
13:00	26	41	229	7		360	6		230	10	13	233	63	71	90	54	58
14:00	24	37	219	0		0	6		230	5	10	238	65	58	72	57	62
15:00	25	38	229	5		140	3		210	12	26	217	80	52	87	60	81
16:00	24	37	224	0		0	6		210	21	35	246	96	67	105	68	89
17:00	33	51	226	10		180	0		0	11	38	291	92	66	111	77	78
18:00	27	52	242	38	46	260	13	23	250	3	38	26	107	65	83	98	168
19:00	28	42	242	39	46	260	30	43	250	26	37	301	995	55	578	512	995
20:00	22	43	241	33	45	240	21	30	260	15	34	284	265	127	202	319	453
21:00	25	38	235	21		260	11		280	12	32	286	597	384	126	253	804
22:00	13	32	249	11	24	300	26	39	290	4	18	298	320	91	422	646	189
23:00	9	18	247	17		310	9		350	11	19	36	459	29	107	148	474

Wind data for KIPL and KNJK from the NCEI's QCLCD system. Wind data for Mountain Springs Grade (TNSC1) and Fish Creek Mountains (FHCC1) from the University of Utah's MesoWest system. 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

As mentioned above, there were eight (8) Urgent Weather Messages containing Wind Advisories and/or blowing dust advisories describing the strong gusty westerly winds affecting southeastern California, extending from the San Diego County mountains and deserts, all of Imperial County, western Arizona and southern Nevada. As the low pressure with associated cold front, moved through the area during the evening hours, the surface pressure gradient strengthened creating 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.²⁰ As transported windblown dust entered Imperial County due to increasing gusty westerly winds, air quality for the Brawley and Westmorland degraded to unhealthy levels. Overall, the strong gusty westerly winds associated with the weather system affected air quality in Imperial County.

FIGURE 3-3
IMPERIAL VALLEY AIR QUALITY INDEX FOR BRAWLEY
DECEMBER 20, 2017



Fig 3-3: The degradation, or affect upon air quality, maybe determined when the AQI changes from a “Yellow” or Moderate level to an “Orange” or Unhealthy for Sensitive Groups level

²⁰ 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 WESTMORLAND
DECEMBER 20, 2017
PM10



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

III.1 Summary of Forecasts and Warnings

Area Forecast Discussions issued by the NWS offices in Phoenix and San Diego described a trough, digging southeast into Nevada, "...dragging a cold front across..." the region by Wednesday, December 20, 2017.²¹ Because winds were expected to reach advisory level wind speeds and the elevated potential for blowing dust along the southeastern portion of Riverside, San Diego and Imperial counties, with specific mentions of Interstates 8, 10, and 15 through the mountains the NWS offices issued eight (8) Urgent Weather Messages.²² The issued Urgent Weather Messages advised of advisory level winds within the San Diego County Mountains, southeastern Riverside and Imperial County.²³ **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), and Imperial County as well as from other automated meteorological instruments upstream from the Brawley and Westmorland monitors. Data analysis indicates that on December 20, 2017 different sites measured wind speeds at or above 25 mph.

²¹ National Weather Service, Area Forecast Discussion, Dec., 19, 2017, San Diego office, 741am PST

²² National Weather Service, Urgent Weather Message, Dec., 19, 2017, San Diego office, 513pm PST

²³ National Weather Service, Urgent Weather Messages, Dec., 19, 2017 to Dec., 21, 2017, San Diego and Phoenix NWS offices, 341am MST; 316pm MST; 513pm PST; 245am PST; 222pm PST; 721pm PST; 1152pm PST and 1216am PST

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 PM₁₀ concentrations at the Brawley and Westmorland monitors for the period of January 1, 2010 through December 20, 2017. 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).²⁴ 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 PM₁₀ concentrations, between January 1, 2010 and December 20, 2017, as measured by the Brawley and Westmorland monitors, was used to establish the historical and seasonal variability over time.²⁵ All figures illustrate that the exceedance, which occurred on December 20, 2017, 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.

²⁴ 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 PM₁₀ 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/m³) 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 PM₁₀ concentrations to PM₁₀ concentrations with in this demonstration.

²⁵ FRM sampling ended December 2016.

FIGURE 4-1
BRAWLEY HISTORICAL COMPARISON
FRM AND FEM PM₁₀ 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO DECEMBER 20, 2017

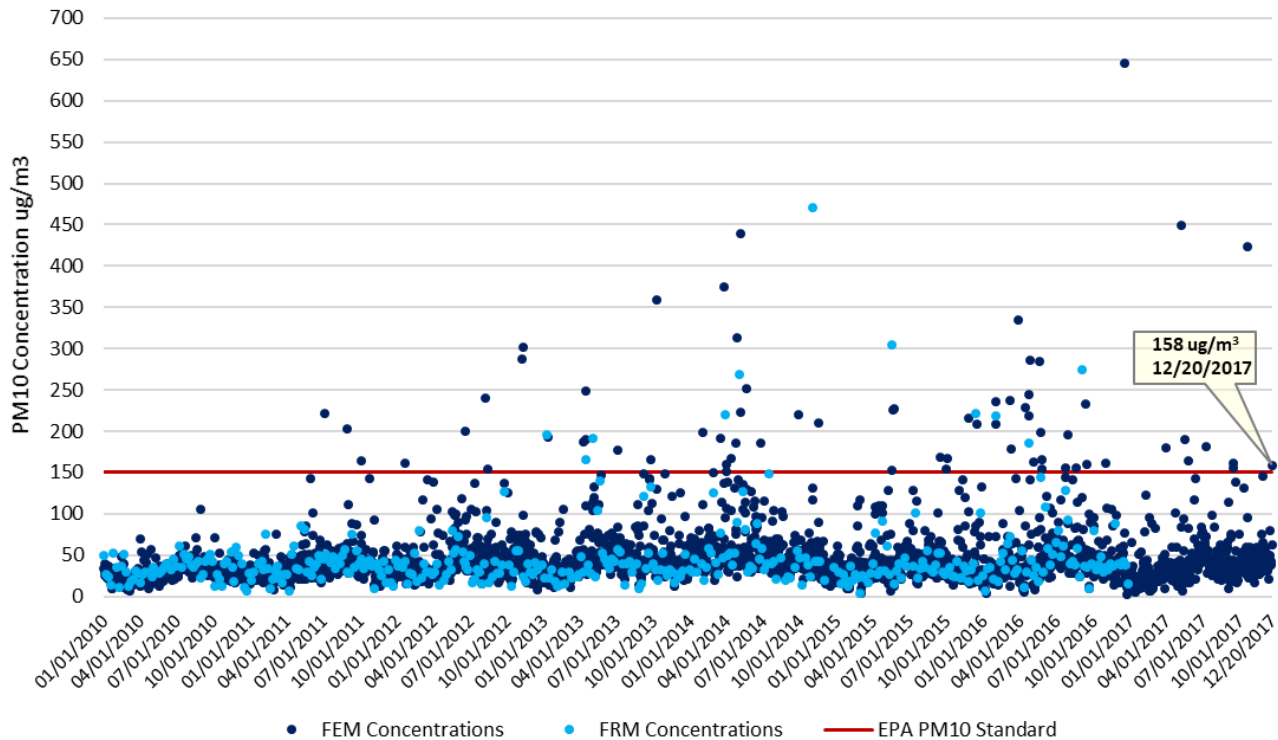


Fig 4-1: A comparison of PM₁₀ historical concentrations demonstrates that the measured concentration of 158 µg/m³ on December 20, 2017 by the Brawley monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-1**, for Brawley included 2,911 sampling days (January 1, 2010 through December 20, 2017). Of the 2,911 sampling days the Brawley monitor measured 68 exceedance days which translates into an occurrence rate less than 2.5%. Historically, there were twelve (12) exceedance days measured during the first quarter, twenty-seven (27) 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
WESTMORLAND HISTORICAL COMPARISON
FRM AND FEM PM₁₀ 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO DECEMBER 20, 2017**

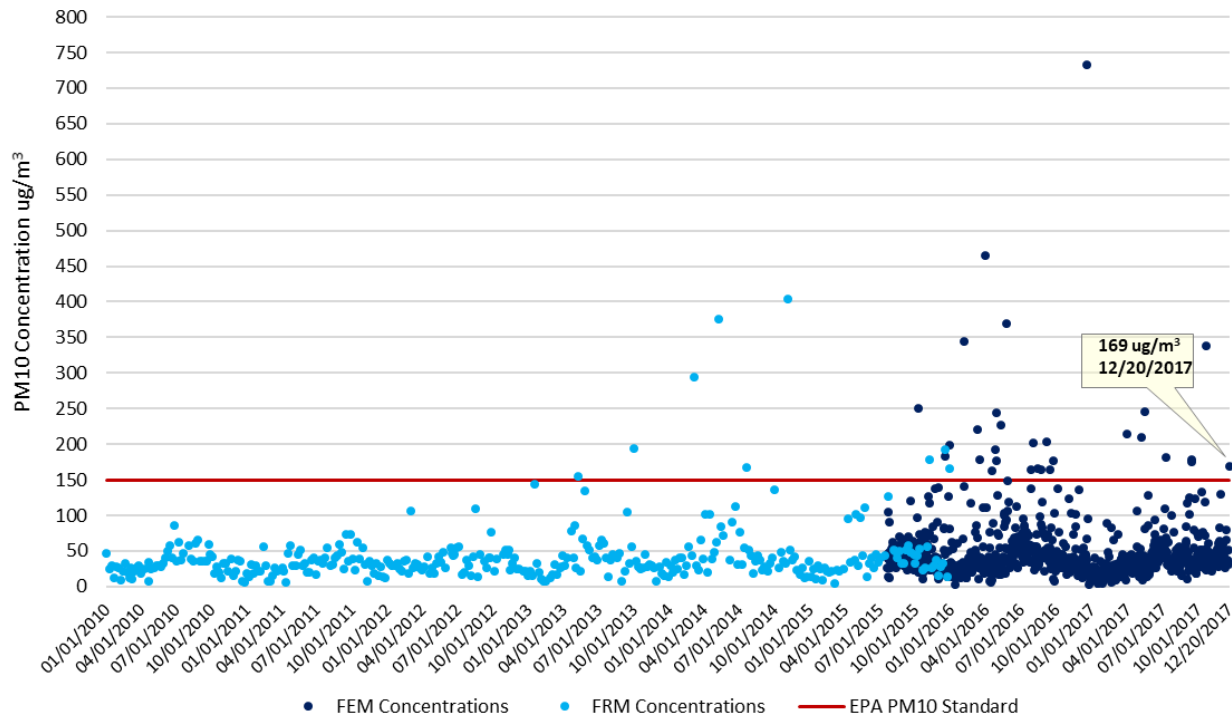
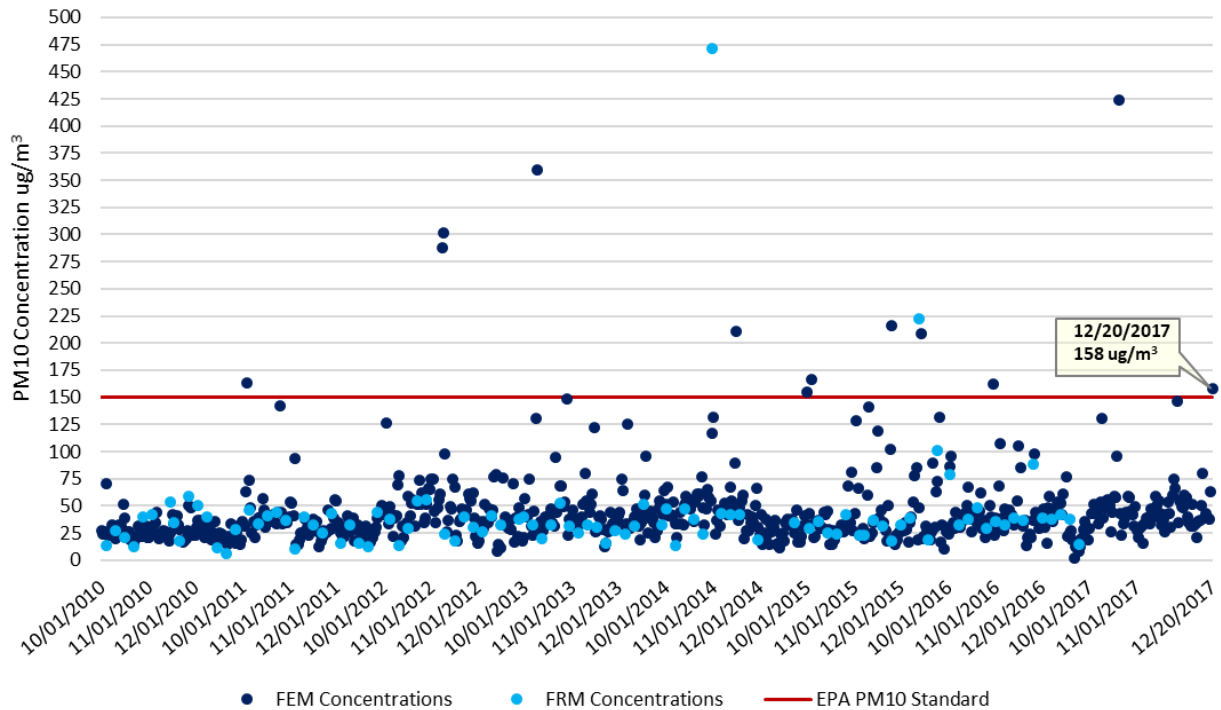


Fig 4-2: A comparison of PM₁₀ historical concentrations demonstrates that the measured concentration of 169 $\mu\text{g}/\text{m}^3$ on December 20, 2017 by the Westmorland monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-2**, for Westmorland included 1,239 sampling days (January 1, 2010 through December 20, 2017). Of the 1,239 sampling days the Westmorland monitor measured 36 exceedance days which translates into an occurrence rate less than 3%. Historically, there were six (6) exceedance days measured during the first quarter, ten (10) 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 4-3
BRAWLEY SEASONAL COMPARISON
FRM AND FEM PM₁₀ 24-HR AVG CONCENTRATIONS
*OCTOBER 1, 2010 TO DECEMBER 20, 2017**

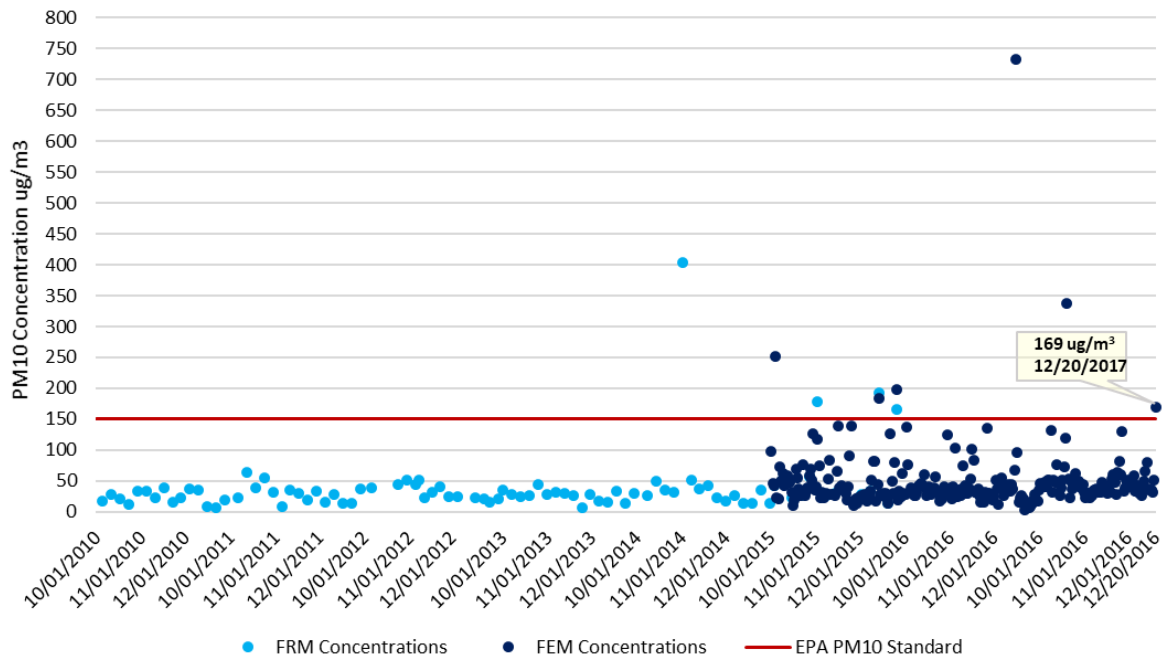


***Quarterly: October 1, 2010 to December 31, 2016 and October 1, 2017 to December 20, 2017**

Fig 4-3: A comparison of PM₁₀ seasonal concentrations demonstrates that the measured concentration of 158 µg/m³ on December 20, 2017 by the Brawley monitor was outside the seasonal concentrations when compared to similar event days and non-event days

Figure 4-3 illustrates the seasonal fluctuations over a period of 725 sampling days, 824 credible samples and thirteen (13) exceedance days. This translates to less than a 2% seasonal exceedance occurrence rate.

FIGURE 4-4
WESTMORLAND SEASONAL COMPARISON
FRM AND FEM PM₁₀ 24-HR AVG CONCENTRATIONS
***OCTOBER 1, 2010 TO DECEMBER 20, 2017**



***Quarterly: October 1, 2010 to December 31, 2016 and October 1, 2017 to December 20, 2017**

Fig 4-4: A comparison of PM₁₀ seasonal concentrations demonstrates that the measured concentration of 169 µg/m³ on December 20, 2017 by the Westmorland monitor was outside the seasonal concentrations when compared to similar event days and non-event days

Figure 4-4 illustrates the seasonal fluctuations over a period of 344 sampling days, 355 credible samples and eight (8) exceedance days. This translates to less than a 2.5% seasonal exceedance occurrence rate.

Examining the historical and seasonal time series concentrations as they relate to the December 20, 2017 measured exceedance, the exceedance measured on December 20, 2017 is 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 of Imperial County. The origination of these emissions from these areas affected Brawley and Westmorland significantly on December 20, 2017. Since Imperial County does not have jurisdiction over emissions emanating from San Diego County, it is not reasonably controllable or preventable by Imperial County.

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 (PM₁₀) 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 PM₁₀ 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 PM₁₀ 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 PM₁₀. 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**

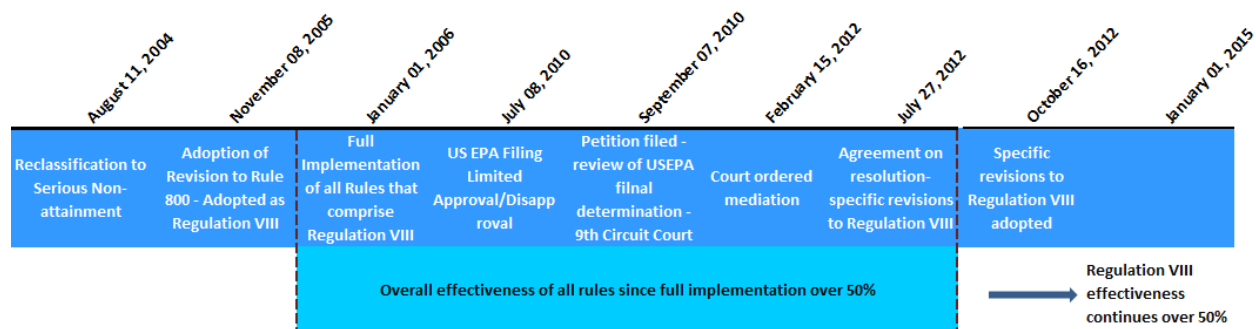


Fig 5-1: Regulation VIII Graphic Timeline

V.1 Wind Observations

As previously discussed, wind data analysis indicates that on December 20, 2017 different sites measured wind speeds at or above 25 mph. Wind speeds of 25 mph are normally sufficient to overcome most PM₁₀ control measures. During the December 20, 2017 event, wind speeds were above the 25 mph threshold, overcoming the BACM in place.

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 Brawley and Westmorland during the December 20, 2017 PM₁₀ exceedance. 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 PM₁₀ emissions. There were no complaints filed on December 20, 2017, officially declared as a Burn Day, related to agricultural burning, waste burning or dust.

FIGURE 5-2 PERMITTED SOURCES

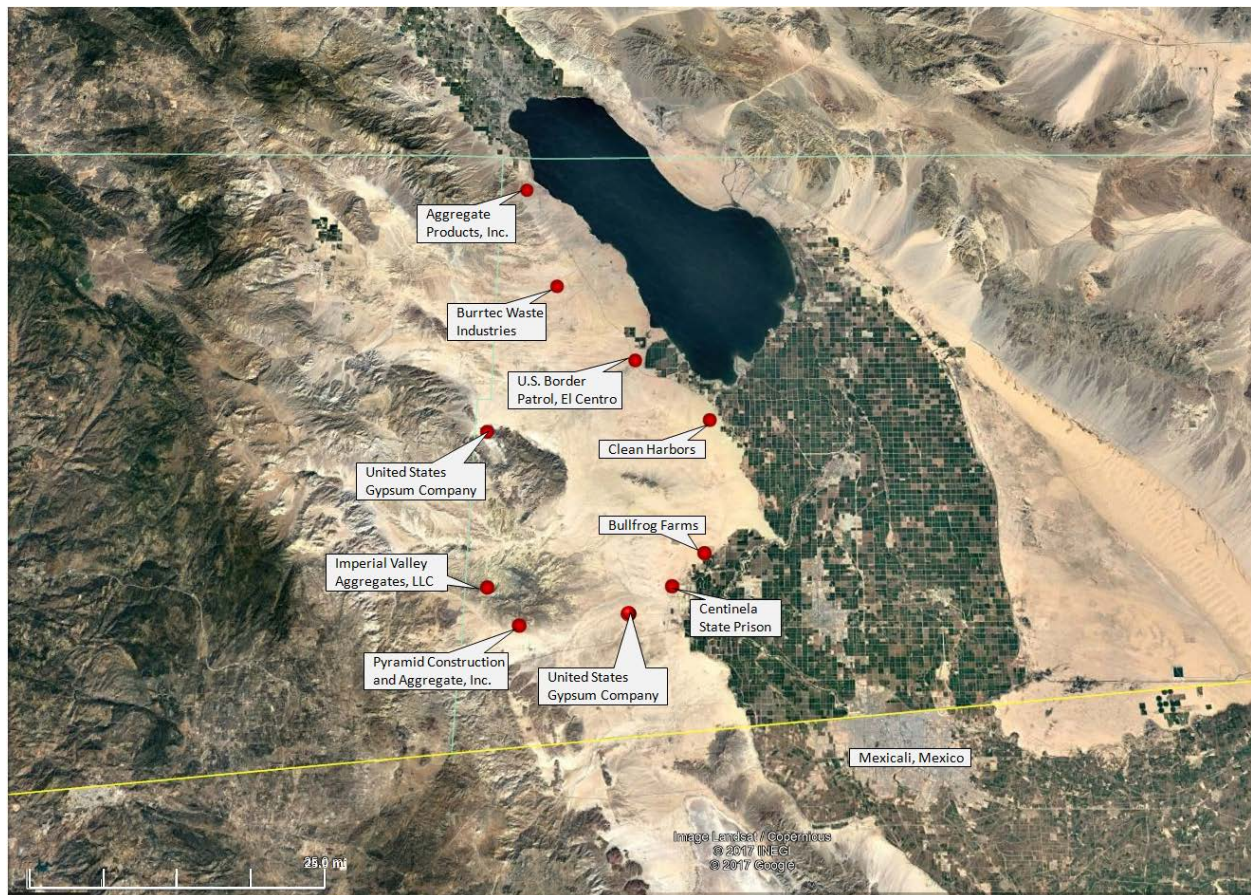


Fig 5-2: The above map identifies those permitted sources located west, northwest and southwest of the Brawley and Westmorland monitors. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the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

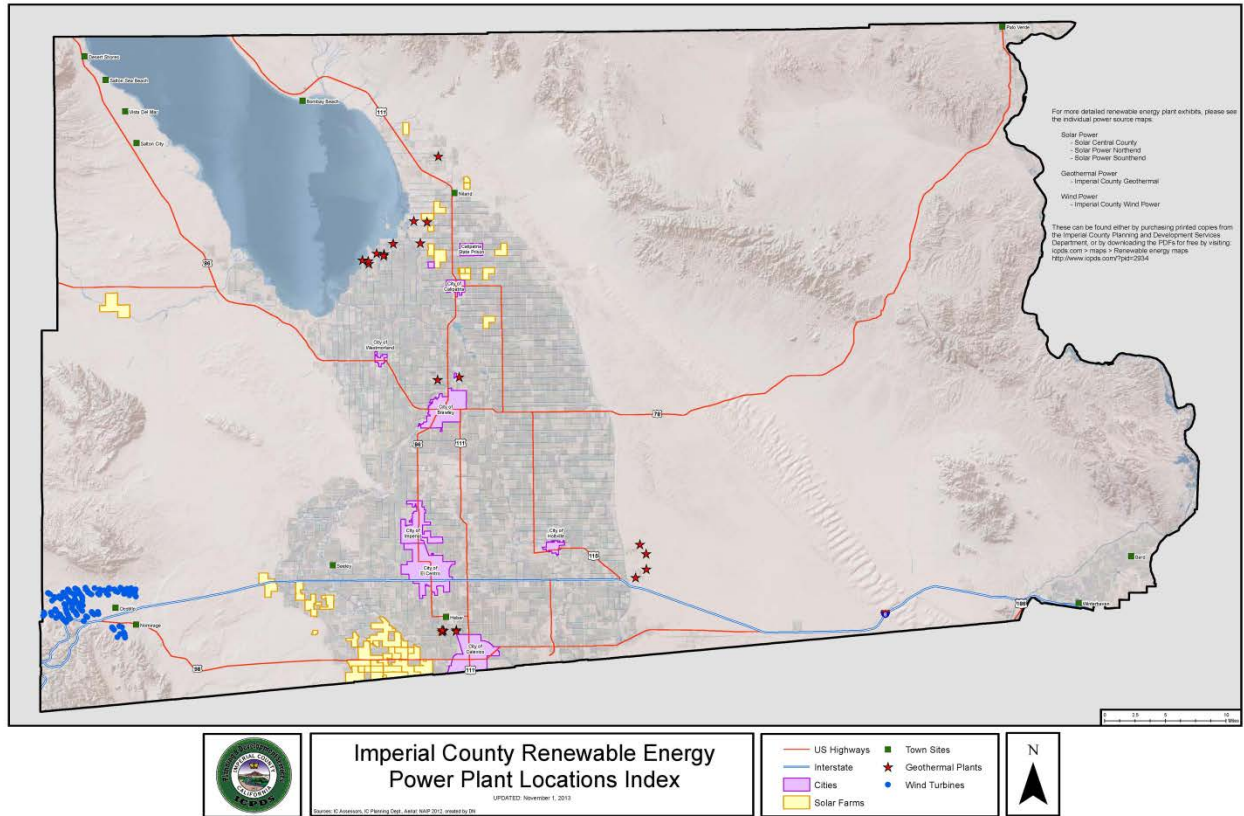


Fig 5-3: The above map identifies those power sources located west, northwest and southwest of the Brawley and Westmorland monitors. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

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 affecting air quality. On December 20, 2017, a trough and associated cold front moved southeast into Nevada bringing moderately strong gusty westerly winds. As the trough moved southeast onshore surface pressure gradients strengthened creating gusty westerly winds across the mountains and deserts during the afternoon and evening hours of December 20, 2017. Winds remained moderate, as the cold front entered southeast California during the early morning hours of December 20, 2017. However, as the cold front moved eastward during the evening hours winds increased significantly.²⁶ Advisory level winds were expected along the southeastern portion of Riverside, Imperial County and along Interstates 8, 10, and 15 through the mountains and down into the deserts.²⁷

The weather disturbance affected air quality in Imperial County as evidenced by the elevated measured concentrations of particulates by the air quality monitors. Two factors were important in the exceedance that occurred on December 20, 2017. The first, with the shifting of the wind direction to a due west, the moderate gusty westerly winds significantly increased during the evening hours. These winds blew over mountain ridgetops, generating and transporting fugitive dust emission on to the open natural deserts along the western portion of Imperial County.²⁸ As a consequence, all regulatory monitors in Imperial County measured elevated hourly concentrations over 100 mg/m³ during the evening hours of December 20, 2017.

Secondly, although moisture was light the passing of the cold front did provide sufficient precipitation to allow lower levels of transported emissions within Imperial County.²⁹ Moisture levels were similarly present within Imperial County and other upwind areas evidenced by the two or more hours of measured precipitation at KIPL and KNJK (**Table 6-1**). The presence of the light moisture provided sufficient amounts of precipitation to reduce levels of transported fugitive emissions allowing areas surrounded by urbanization such as Calexico and El Centro, and areas further east, away from the primary trajectory of source emissions, such as Niland not to exceed.³⁰ As such, both Westmorland and Brawley marginally exceeded the PM₁₀ NAAQS on December 20, 2017.

²⁶ National Weather Service, Area Forecast Discussion, Dec., 20, 2017, Phoenix office, 244pm MST

²⁷ National Weather Service, Urgent Weather Message, Dec., 19, 2017, San Diego office, 513pm PST

²⁸ National Oceanic and Atmospheric Administration, Satellite Services Division, Descriptive text narrative for smoke/dust observed in Satellite Imagery, Dec., 20, 2017

²⁹ National Weather Service, Area Forecast Discussion, Dec., 20, 2017, San Diego office, 130pm PST

³⁰ National Weather Service, Area Forecast Discussion, Dec., 20, 2017, San Diego office, 945pm PST

TABLE 6-1

PRECIPITATION TOTALS	
LOCATION*	12/20/2017
El Centro NAF (KNJK)	Trace
Imperial County Airport (KIPL)	Trace

* All data derived from the Local Climatological Data Hourly Observations (LCDHO) reports released by the NOAA <https://www.ncdc.noaa.gov/>

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 December 20, 2017 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 the mountain and desert slopes within San Diego County 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 PM₁₀ exceedance measured at the Brawley and Westmorland 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 PM₁₀ exceedance at Brawley and Westmorland on December 20, 2017, 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 PM₁₀ exceedance that occurred at Brawley and Westmorland on December 20, 2017, was caused by the transport of windblown dust into Imperial County by strong westerly winds associated with a passing weather disturbance. 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 PM₁₀ concentrations measured at the Brawley and Westmorland monitors in Imperial County demonstrates a consistency of strong gusty westerly winds with elevated concentrations of PM₁₀ on December 20, 2017. In addition, temporal analysis indicates that the elevated PM₁₀ concentrations and the strong gusty westerly winds were an event that was widespread, regional and not preventable. Days before the high wind event PM₁₀ 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 December 20, 2017.

VI.5 Concentration to Concentration Analysis

The historical annual and seasonal 24-hr average PM₁₀ measured concentrations at the Brawley and Westmorland monitors was 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 cold front associated with the passing of a low-pressure system through southeastern California. The information provides a clear causal relationship between the entrained windblown dust and the PM₁₀ exceedance measured at the Brawley and Westmorland monitors on December 20, 2017.

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.³¹

³¹ 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.