IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

Flower Fields, Imperial County by Jasmyn Phillips June 12, 2016; https://www.youtube.com/watch?v=hRWCyZn-KXs

October 3, 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 Westmorland monitor in Imperial County, California on October 3, 2018

TABLE OF CONTENTS

SECTION PAGE

I Introduction 1
- I.1 Public Notification [40 CFR §50.14(c)(1)] 3
- I.2 Initial Notification of Potential Exceptional Event (INPEE) (40 CFR §50.14 (c)(2)) 3
- I.3 Public Comment Process [40 CFR §50.14(c)(3)(v)(A-C)] 4
- I.4 Mitigation of Exceptional Events [40 CFR §51.930] 4

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 9
- II.1 Description of the event causing the exceedance 9
- II.2 How emissions from the event led to an exceedance 9

III Clear Causal Relationship – A demonstration that the event affected air quality illustrating the relationship between the event and the monitored exceedance 17
- III.1 Summary of Forecasts and Warnings 25
- III.2 Summary of Wind Observations 26

IV Concentration to Concentration Analysis – An analyses comparing the event-influenced concentrations to concentrations at the same monitoring site at other times 27

V Both Not Reasonably Controllable and Not Reasonably Preventable – A demonstration that the event was both not reasonably controllable and not reasonably preventable 30
- V.1 Other PM_{10} Control Measures 31
- V.2 Wind Observations 33
- V.3 Review of Source Permitted Inspections and Public Complaints 33

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 36
- VI.1 Affects Air Quality 36
- VI.2 Not Reasonably Controllable or Preventable 36
- VI.3 Natural Event 37

VI.4 Clear Causal Relationship....37
VI.5 Concentration to Concentration Analysis....37
VI.6 Conclusion....37

Appendix A: National Weather Service Notices....39

Appendix B: Wind Data....114

Appendix C: Public Information and other Notices....137

LIST OF FIGURES

FIGURE **PAGE**

Figure 1-1 Imperial County 6

Figure 1-2 Monitoring Sites in And Around Imperial County 8

Figure 2-1 Monitoring and Meteorological Sites 10

Figure 2-2 Concentrations for All Sites Listed in Table 2-1 12

Figure 2-3 Local and Vicinity Airport Wind Speeds and Gust 13

Figure 2-4 Wind Speeds and Gust Upstream Sites 14

Figure 2-5 HYSPLIT Model All Sites October 3, 2018 1800 PST 15

Figure 2-6 HYSPLIT Model All Sites October 3, 2018 1900 PST 16

Figure 3-1 KYUX Radar for October 3, 2018—1650 PST 18

Figure 3-2 KYUX Radar for October 3, 2018—1654 PST 19

Figure 3-3 KYUX Radar for October 3, 2018—1706 PST 20

Figure 3-4 Visual Ramp-Up Analysis as Discussed for October 3, 2018 21

Figure 3-5 72-Hour Time Series PM_{10} Concentrations and Visibility 22

Figure 3-6 Imperial Valley Air Quality Index for Westmorland October 3, 2018 25

Figure 4-1 Westmorland Historical Comparison FRM and FEM PM_{10} 24-Hr Avg Concentrations January 1, 2010 To October 3, 2018 28

Figure 4-2 Westmorland Seasonal Comparison FRM And FEM PM_{10} 24-Hr Avg Concentrations October 1, 2010 To October 3, 2018 29

Figure 5-1 Regulation VIII Graphic Timeline Development 31

Figure 5-2 Permitted Sources 34

Figure 5-3 Non-Permitted Sources 35

LIST OF TABLES

TABLE **PAGE**

Table 1-1 Title 40 CFR §50.14(c)(3)(iv) Checklist 1

Table 1-2 Procedural Checklist 2

Table 2-1 Hourly Concentrations of Particulate Matter 11

Table 3-1 Wind Speeds and PM_{10} Concentrations October 3, 2018 23

Table 3-2 Wind Speeds and PM_{10} Concentrations October 3, 2018 24

Table 5-1 San Diego Air Pollution Control District Rules 32

Table 5-2 Mojave Desert Air Quality Management District Rules 32

Table 5-3 South Coast Air Quality Management District Rules 33

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. 27
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. 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 EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM_{10})		DOCUMENT SECTION
1	**Public Notification [40 CFR §50.14(c)(1)]** – In accordance with mitigation requirement at 40 CFR 51.930(a)(1), notification to the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard	Pg. 3 and Appendix C
2	**Initial Notification of Potential Exceptional Event [40 CFR §50.14(c)(2)]** - Submission to the Administrator of an Initial Notification of Potential Exceptional Event and flagging of the affected data in US EPA's Air Quality System (AQS) as described in 40 CFR §50.14(c)(2)(i),	Pg. 3
3	**Public Comment Process [40 CFR §50.14(c)(3)(v)]** - Documentation of fulfillment of the public comment process described in 40 CFR §50.14(c)(3)(v), and	Pg. 4 and Appendix C
4	**Mitigation of Exceptional Events [40 CFR §51.930]** - Implementation of any applicable mitigation requirements (Mitigation Plan) as described in 40 CFR §51.930	Pg. 4

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

As such, this report demonstrates that a naturally occurring event caused an exceedance observed on Wednesday, October 3, 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 Tuesday, October 2, 2018 and Wednesday October 3, 2018, the ICAPCD published advisories concerning the potential for elevated concentrations of particulate matter caused by gusty westerly winds preceding the passage of a trough of low-pressure by Wednesday, October 3, 2018. An update to the October 3, 2018 advisory was posted at 1600 PST advising the public of the potential for elevated concentrations resulting from gusty winds. **Appendix C** contains copies of notices pertinent to the October 3, 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 Wednesday, October 3, 2018, a naturally occurring event elevated particulate matter within San Diego, Riverside and Imperial Counties, causing an exceedance at the Westmorland (06-025-4003) air quality monitoring station. 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 Westmorland monitor on October 3, 2018. After review, CARB submitted the INPEE, for the October 3, 2018 event in July of 2019. The submitted request included a brief description of the meteorological conditions for October 3, 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.

[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 October 3, 2018 exceptional event prepared by the ICAPCD. After addressing all substantive and non-substantive comments by both CARB and USEPA the ICAPCD has published a notice of availability in the Imperial Valley Press announcing a 30-day public review process. The published notice invites comments by the public regarding the request, by the ICAPCD, to exclude the measured concentrations of 169 µg/m^3 measured by the Westmorland monitor on October 3, 2018.

(B) Concurrently with the Public Review period for the October 3, 2018 exceptional event, the ICAPCD is formally submitting to CARB for remittance to USEPA the Final October 3, 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

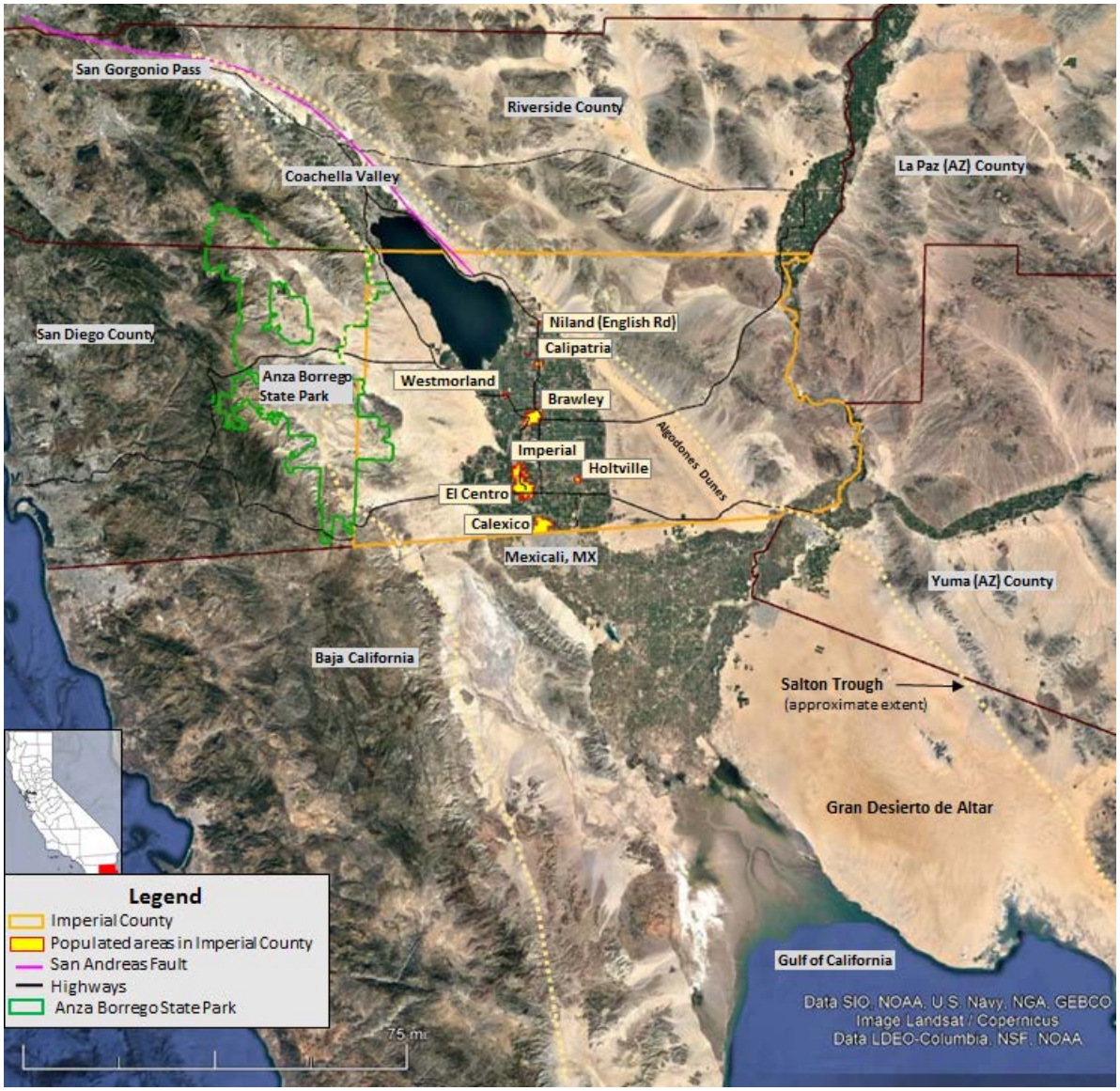


Fig 1-1: Imperial County a Southern California border region, within far southeast California bordering Arizona and Mexico has a small economically diverse region with a population of 174,528

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 Wednesday, October 3, 2018 the National Weather Service (NWS) offices in Phoenix and San Diego issued Area Forecast Discussions describing the rainfall event brought about by tropical storm Rosa and how Rosa was being steered towards the north northwest ahead of a large upper low that approached the California coast.[4] The cutoff low-pressure system moved slowly into central and Southern California producing gusty southwest to west winds along the San Diego Mountains and deserts.[5] Although light showers were falling north of San Diego County the forecast called for the chance of thunderstorms between 400pm and 8pm.[6] In fact the San Diego NWS office described the showers as moving northeast under a deep layer southwest flow ahead of the deep closed low predicting that the lower deserts would be hard pressed to see much rain but there was a possibility that a few convective cells would make it over the mountains.[7]

As the day progressed on October 3, 2018 the Phoenix NWS office issued numerous Special Weather Statements, Significant Weather Advisories, Severe Weather Statements, and Severe Thunderstorm Warnings for areas within and around southeastern California into western Arizona. Two Special Weather Statement identified severe thunderstorms near Plaster City and near Westmorland.[8,9] **Appendix A** contains all pertinent NWS notices.

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

On Wednesday, October 3, 2018, the air monitors in Imperial and Yuma counties measured elevated concentrations of particulate matter when an approaching low steered the remnants of Tropical Storm Rosa northward out of Baja California and created a monsoonal-like pattern causing unstable atmospheric conditions. The resulting meteorological conditions produced thunderstorms that spawned strong, gusty winds that generated emissions from within the natural open mountains and desert areas within San Diego County. These windblown dust emissions were transported to all the Imperial

[4] National Weather Service, Area Forecast Discussion, October 1, 2018, Phoenix office, 1239pm MST
[5] National Weather Service, Area Forecast Discussion, October 3, 2018, San Diego office, 247am PDT
[6] *Id.*
[7] National Weather Service, Area Forecast Discussion, October 3, 2018, San Diego office, 940am PDT
[8] National Weather Service, Special Weather Statement, October 3, 2018, Phoenix office, 336pm MST
[9] National Weather Service, Special Weather Statement, October 3, 2018, Phoenix office, 551pm MST

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

FIGURE 2-1
MONITORING AND METEOROLOGICAL SITES

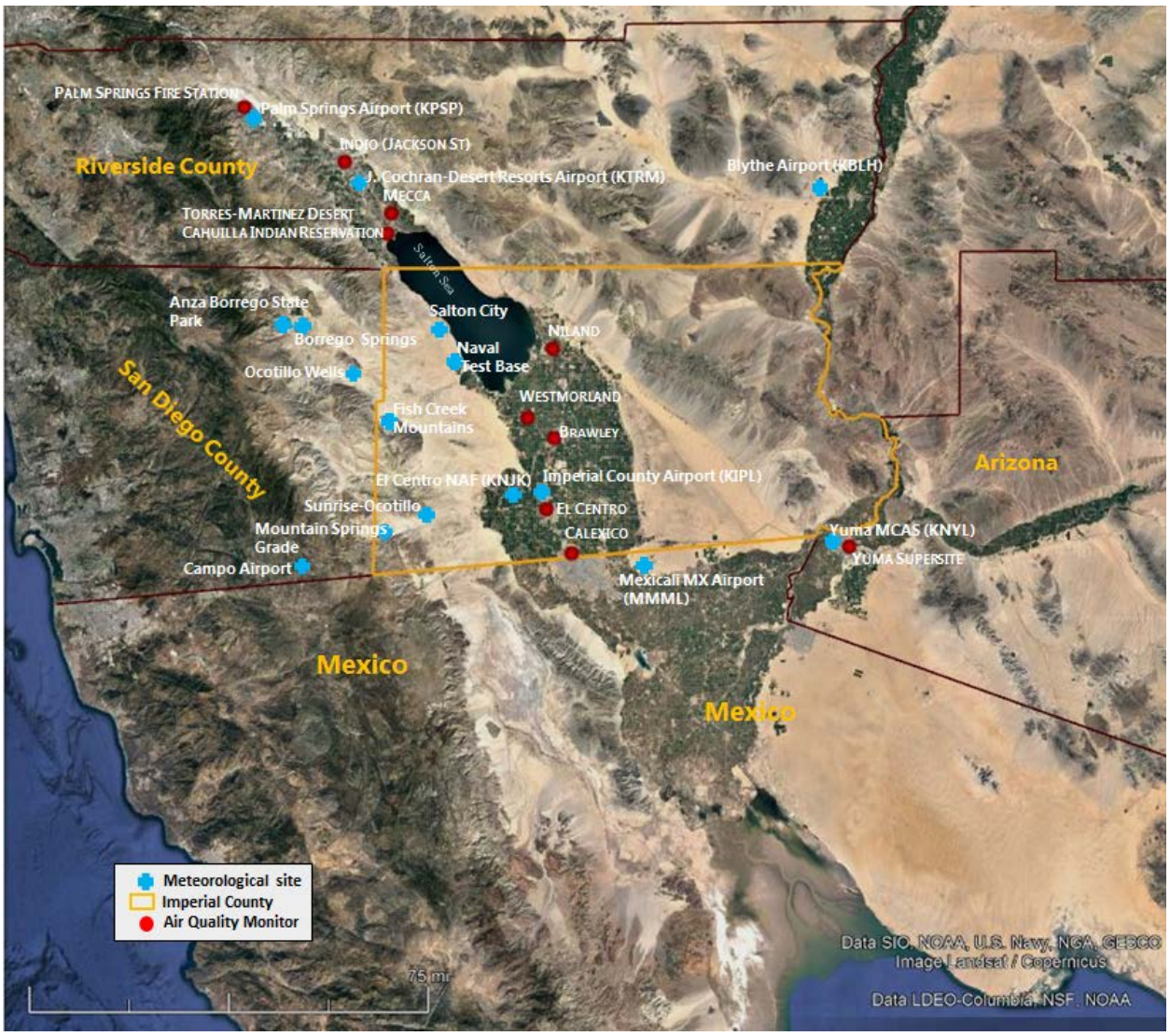


Fig 2-1: Includes a general location of the sites used in this analysis. The site furthest south is in Mexicali, Mexico and the site furthest north is the Palm Springs Fire Station

TABLE 2-1
HOURLY CONCENTRATIONS OF PARTICULATE MATTER

SITE	DATE	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
PALM SPRINGS FIRE STATION	20181002	10	9	10	9	9	11	19	14	16	6	6	9	7	9	9	22	26	28	22	16	18	13	10	8	28	13
	20181003	12	10	10	10	12	20	42	20	14	11	6	8	21	28	38	53	37	31	17	18	20	12	10	9	**53**	19
	20181004	5	7	4	6	6	8	21	16	8	3	4	9	12	8	15	32	18	15	18	23	22	16	13	13	32	12
INDIO	20181002	15	14	15	16	15	21	28	21	17	13	9	7	8	14	34	13	13	19	59	65	38	19	16	12	65	20
	20181003	13	11	11	14	20	35	49	40	17	10	11	14	25	21	19	30	59	18	13	20	23	22	14	23	**59**	22
	20181004	12	11	5	9	10	16	20	15	11	7	6	5	7	8	9	13	18	17	31	48	46	31	21	20	48	16
MECCA	20181002	8	38	13	28	27	33	56	53	16	9	5	5	8	15	17	8	13	22	34	26	23	24	21	23	56	21
	20181003	27	7	8	39	17	37	117	135	41	15	8	6	5	12	20	19	35	39	26	22	19	18	14	9	**135**	28
	20181004	12	60	11	10	10	29	89	41	24	13	10	15	15	10	10	5	6	24	35	30	20	32	57	50	89	25
NILAND	20181002	10	11	13	10	13	8	19	15	12	19	24	36	16	18	19	16	18	29	89	67	35	18	7	5	89	21
	20181003	6	7	13	17	21	20	18	33	42	10	15	8	15	20	34	26	32	87	76	157	55	58	30	90	**157**	37
	20181004	60	49	19	9	6	22	35	8	31	7	5	4	7	4	4	3	10	8	18	21	17	20	21	24	60	17
WESTMORLAND	20181002	8	7	6	4	5	10	11	15	15	25		6	9	10	16	12	38	104	53	39	34	18	17	14	104	20
	20181003	15	10	11	8	12	24	46	89	16	9	21	11	28	27	25	23	42	75	391	900	699	781	423	387	**900**	169
	20181004	280	85	53	8	7	13	22	15	10		9	10	8	9	5	4	10	12	14	8	8	72	127	29	280	35
BRAWLEY	20181002	5	4	4	8	5	4	6	8	7	6	5	4	5	4	5	11	22	70	45	17	8	22	10	11	70	12
	20181003	7	5	5	5	6	8	21	16	15	2	6	5	13	22	8	13	16	50	117	185	323	596	394	393	**596**	92
	20181004	142	223	24	22	7	7	12	8	10	7		6	6	2	2	7	8	11	15	24	38	187	134	38	223	40
EL CENTRO	20181002	7	6	2	7	5	6	11	18	13	6	6	9	6	13	18	14	41	38	31	23	12	13	12	12	41	13
	20181003	12	11	13	18	9	18	36	25	18	17	18	26	24	27	30	27	28	46	53	42	30	19	12	120	**120**	28
	20181004	47	33	40	20	17	13	21	16	18	16	13	10	11	7	7	7	9	18	22	17	17	13	11	10	47	17
CALEXICO	20181002	0	-4	-2			0	3	3	3	3	3	10	15	17	13	10	12	30	19	12	9	13	9	5	30	8
	20181003	5	4	5	9	13	40	48	71	62	41	29	19	21	24	18	18	16	25	154	179	204	67	19	16	**204**	46
	20181004	74	29	50	40	9	17	18	25	24	19	8	10	8	5	7	9	8	15	27	24	29	32	31	10	74	22
YUMA AZ SUPERSITE (PST)	20181002	5	5	2	1	2	2	1	2	3	6	5	3	5	7	9	13	11	8	6	3	2	3	3	5	13	4
	20181003	2	2	5	11	16	24	23	11	11	13	9	11	13	9	14	9	34	20	17	12	9	9	45	108	**108**	18
	20181004	186	197	138	175	56	31	24	20	20	14	19	13	16	13	19	19	16	24	29	25	16	19	38	38	197	48
YUMA AZ SUPERSITE (MST)	20181002	2	5	5	2	1	2	2	1	2	3	6	5	3	5	7	9	13	11	8	6	3	2	3	3	13	4
	20181003	5	2	2	5	11	16	24	23	11	11	13	9	11	13	9	14	9	34	20	17	12	9	9	45	**45**	13
	20181004	108	186	197	138	175	56	31	24	20	20	14	19	13	16	13	19	19	16	24	29	25	16	19	23	197	50

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. No data is available for Torres-Martinez Tribal on these dates

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

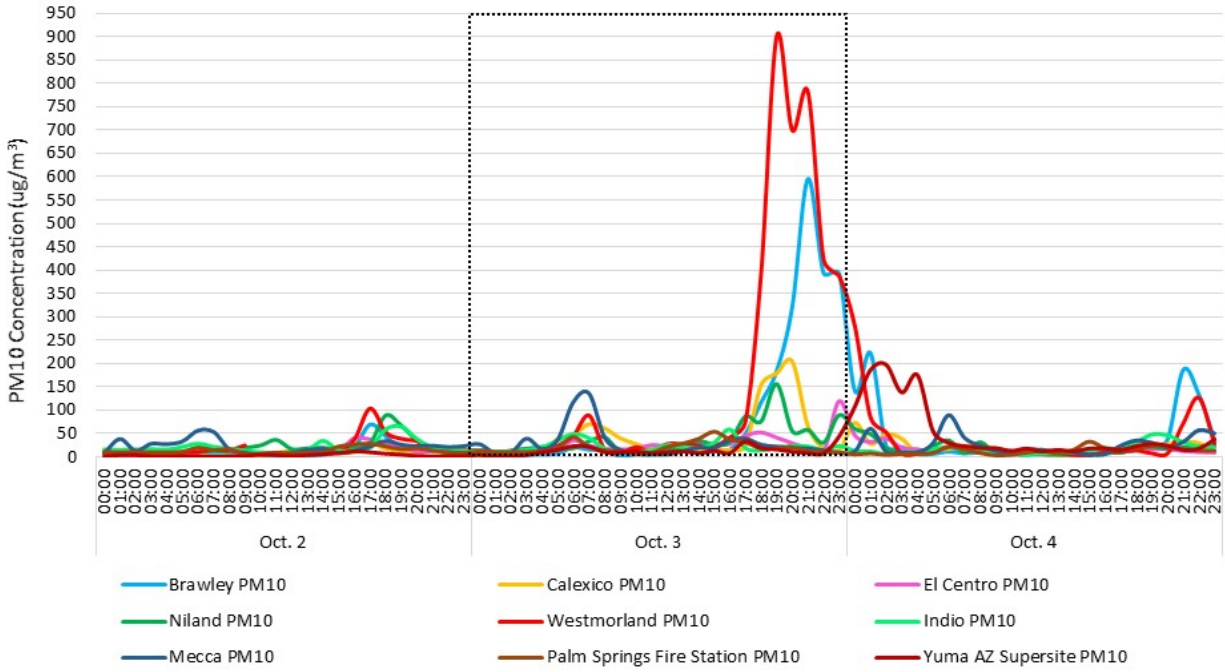


Fig 2-2: is a three-day graphical representation of the PM_{10} concentrations measured at the sites identified in **Table 2-1**. Note the elevated concentrations at the Westmorland monitor coincident with the convective thunderstorm cell near Westmorland identified by the Phoenix NWS office at 551pm on October3, 2018

Wind speed, wind direction and the airflow patterns combined all help explain how windblown emissions resulting from the gusty westerly winds affected all of the monitors in Imperial County on Wednesday, October 3, 2018.

As mentioned above, both of the San Diego and Phoenix NWS offices discussed the severe thunderstorms and gusty outflow winds that developed when an approaching low steered the remnants of Tropical Storm Rosa northward. The Special Weather Statements containing Significant Weather Advisories were issued for the vicinity near Westmorland (**Appendix A**).[10]

Figures 2-3 and 2-4 depict the compiled wind data for regional and neighboring airports and upstream sites. The El Centro NAF (KNJK) in Imperial County measured wind speeds at or above 25 mph or measured wind gusts at or above 25 mph, coincident with measured elevated concentrations.

[10]National Weather Service, Special Weather Statement, Oct., 3, 2018, Phoenix office 551pm MST

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

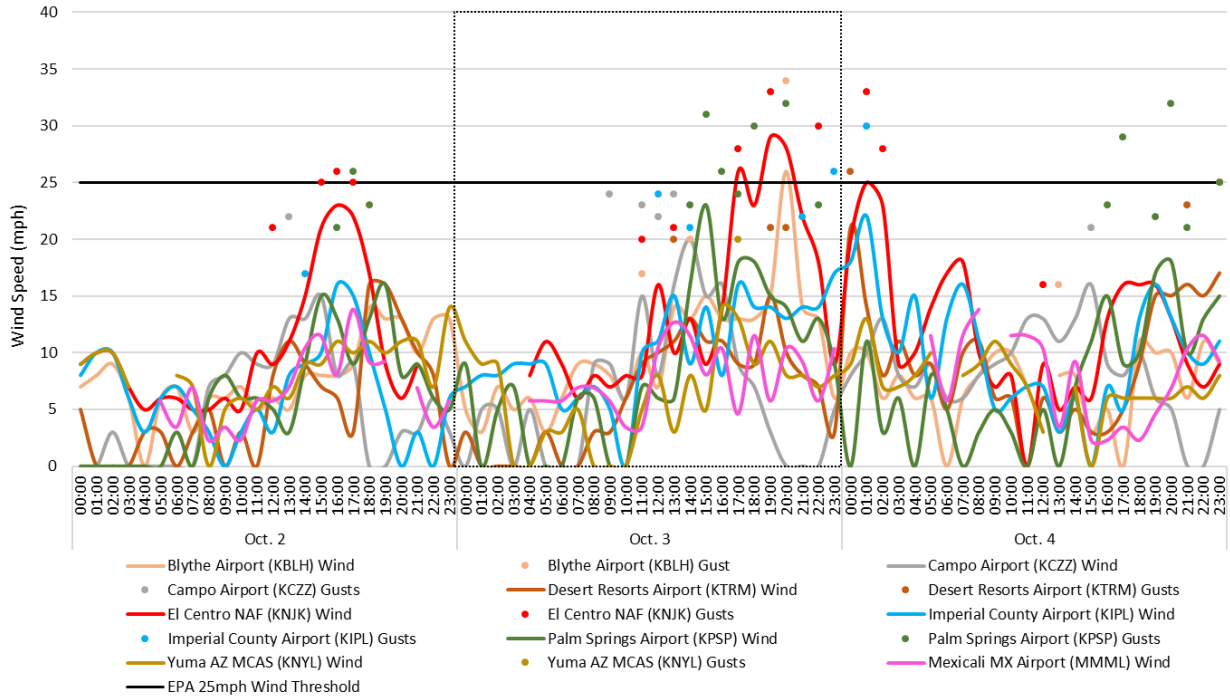


Fig 2-3: is a three-day graphical representation of the measured wind speed and wind gusts (if available) from local and neighboring airports. All data derived from the Local Climatological Data Hourly Observations (LCDHO) reports released by the NOAA https://www.ncdc.noaa.gov/. MMML is from the University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

FIGURE 2-4
WIND SPEEDS AND GUST UPSTREAM SITES

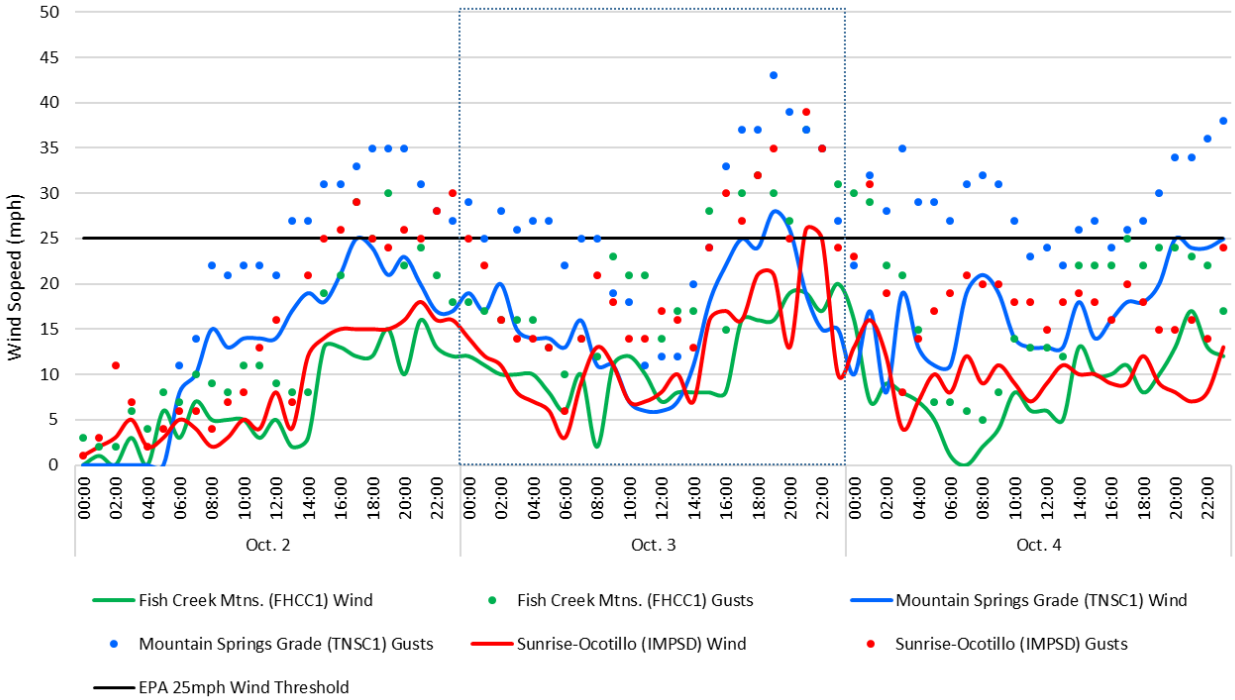


Fig 2-4: is a three-day graphical representation of the measured wind speed and wind gust (if available) sites located upstream from the Imperial County monitors. All data derived from the University of Utah's MesoWest https://mesowest.utah.edu/index.html

The National Oceanic and Atmospheric Administration (NOAA) Laboratory HYSPLIT back-trajectory models[11] provide supporting evidence of the westerly airflow within Imperial County on October 3, 2018. The HYSPLIT back-trajectory models in **Figures 2-5 and 2-6** depict the airflow during the evening hours of 1800 and 1900 PST to help illustrate the southwest to west airflow.

Figure 2-5 depicts the southwest airflow coincident with elevated concentrations above 100 µg/m^3 at the Westmorland, Brawley and Calexico monitors. **Figure 2-6** depicts the westerly airflow with a significant west influence coincident with the peak hourly measured concentrations at the Niland and Westmorland monitors.

[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. 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 OCTOBER 3, 2018 1800 PST

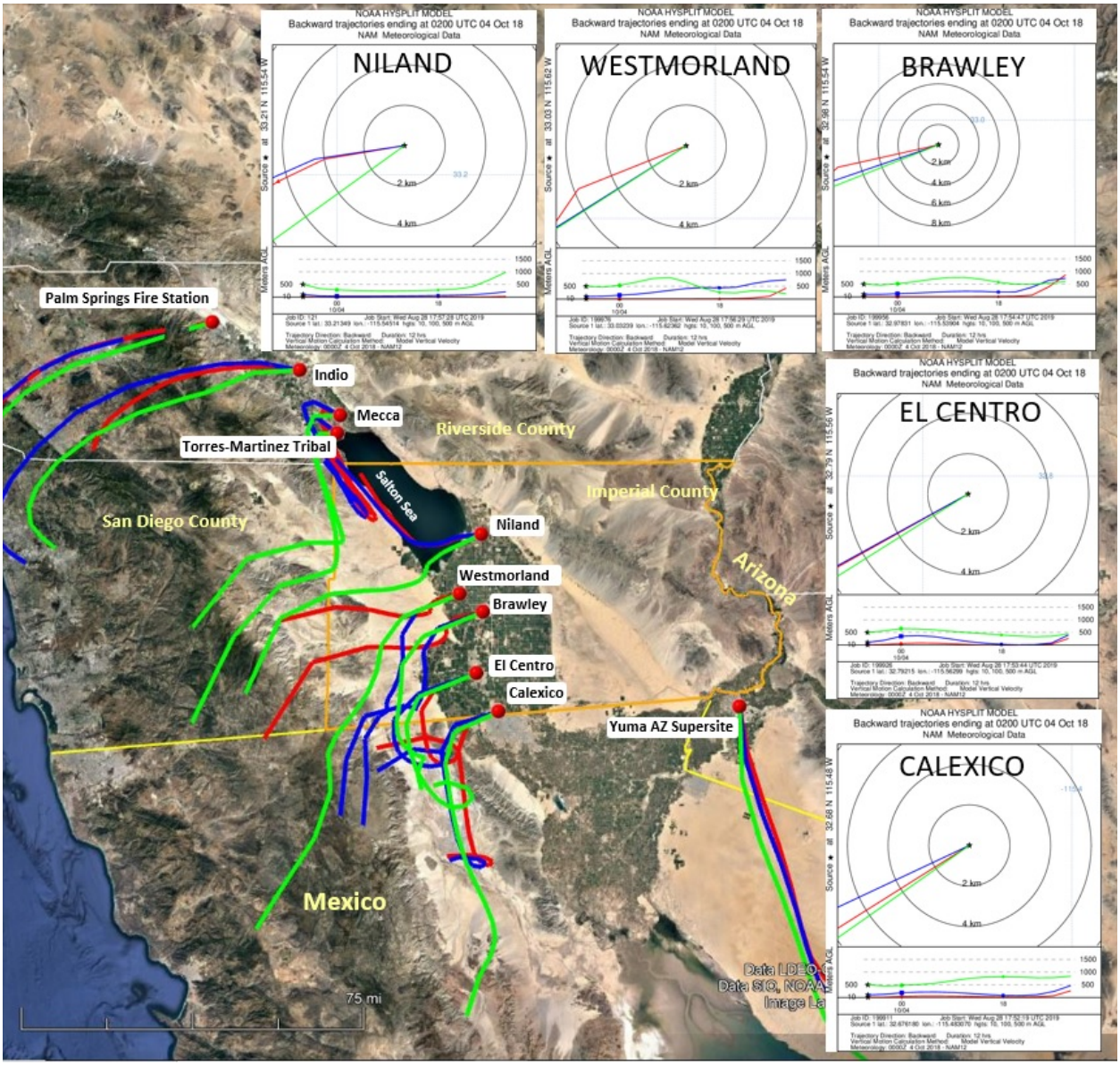


Fig 2-5: A 12-hour HYSPLIT back-trajectory ending at 1800 PST for all sites identified in **Table 2-1**. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

FIGURE 2-6
HYSPLIT MODEL All SITES OCTOBER 3, 2018 1900 PST

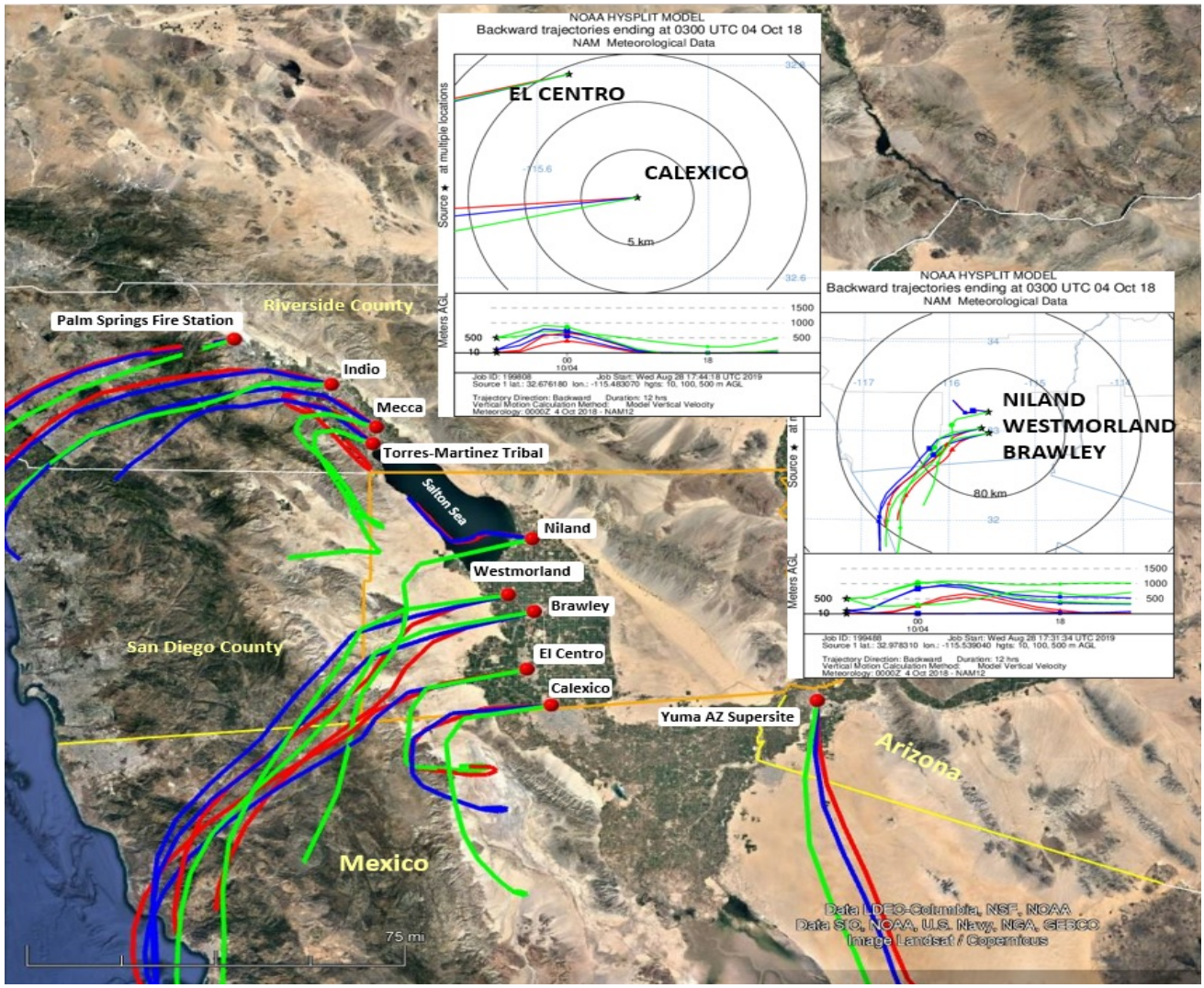


Fig 2-6: A 12-hour back-trajectory HYSPLIT ending at 1900 PST for all sites identified in **Table 2-1**. Red trajectory indicates airflow at 10 meters AGL (above ground level); blue indicates airflow at 100m; green indicates airflow at 500m. Yellow line indicates the international border. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

As gusty southwest to west winds blew over open natural mountains and desert areas west of Imperial County, fugitive windblown dust primarily affected all air quality monitors within Imperial County. The El Centro NAF (KNJK) measure winds at or above 25 mph with gust 30 mph or above on October 3, 2018. As mentioned above, the Phoenix NWS office issued several Special Weather Statements, identifying thunderstorm cells within and surrounding Imperial County. Specifically, a Special Weather Statement issued at 551pm on October 3, 2018 identified a strong thunderstorm near Westmorland or near Brawley coincident with the hour prior to measuring peak hourly concentrations at both monitors.

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 large upper low approaching the California coast steered tropical storm Rosa towards the north northwest, from Baja California, causing atmospheric instability in the form of convective cells around and within Imperial County.[12] The cutoff low-pressure system moved slowly into central and Southern California producing gusty southwest to west winds along the San Diego Mountains and deserts.[13] It is of some worth to note that days prior, record levels of rainfall were measured in Yuma and in San Diego Mountain locations and the Coachella Valley had measurable rain, sufficient to dampen soils prior to any heating of the atmosphere.[14]

As the day progressed, severe thunderstorms formed over southeastern California and across southern Arizona. Two thunderstorms were identified in the vicinity of Westmorland.[15,16] The gusty outflow winds from these thunderstorms transported emissions from the San Diego County mountains and deserts to the Westmorland monitor causing an exceedance of the NAAQS. Numerous places in San Diego County including the mountains measured precipitation.[17] Soils upwind were sufficiently saturated allowing a reduction of transported emissions, less saltation and less deposition on the Imperial County air quality monitors. Outflow boundary winds from the strong thunderstorm identified by the Phoenix NWS office near Westmorland and Brawley allowed for elevated concentrations at both monitors. However, because the thunderstorm was moving northeast at 30 mph, Brawley would not have felt the full impact from the desert to the west while Westmorland, less urbanized would feel the full impact of the storm as it traveled towards the monitor (**Figures 3-1 to 3-3**).

While elevated wind speeds play a significant and important role in the transportation of dust, gusts and precipitation play an equally significant role in the deposition of particulates onto a monitor and the overall affect onto ambient air.[18] As winds and gusts increased on October 3, 2018 and transported windblown dust from open natural desert areas in the San Diego County Mountains into Imperial County air quality degraded. As mentioned in Section I.1 above, the ICAPCD issued an advisory of the potential for

[12] National Weather Service, Area Forecast Discussion, Oct., 1, 2018, Phoenix office, 1239pm MST
[13] National Weather Service, Area Forecast Discussion, Oct., 3, 2018, San Diego office, 247am PDT
[14]National Weather Service, Quantitative Precipitation Forecast, Oct., 2, 2018, San Diego office, 341pm PDGT
[15] National Weather Service, Special Weather Statement, Oct., 3, 2018, Phoenix office, 336pm MST
[16] National Weather Service, Special Weather Statement, Oct., 1, 2018, Phoenix office, 551pm MST
[17] National Weather Service, Temperature and Precipitation Summary, Oct., 4, 2018, San Diego office, 530am PST
[18] 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

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

Figures 3-1 to 3-3 are Doppler Radar images from the KYUX station in Yuma, Arizona that provide supporting documentation of a severe thunderstorm and gust front/outflow boundary winds moving toward Westmorland. The series of images depict the storm's movement over a period of time coincident with elevated concentrations at the Westmorland monitor. For example, the first image (Figure 3-1) is 10 minutes prior to Westmorland measuring 391 ug/m^3.

FIGURE 3-1
KYUX RADAR FOR OCTOBER 3, 2018 1650 PST

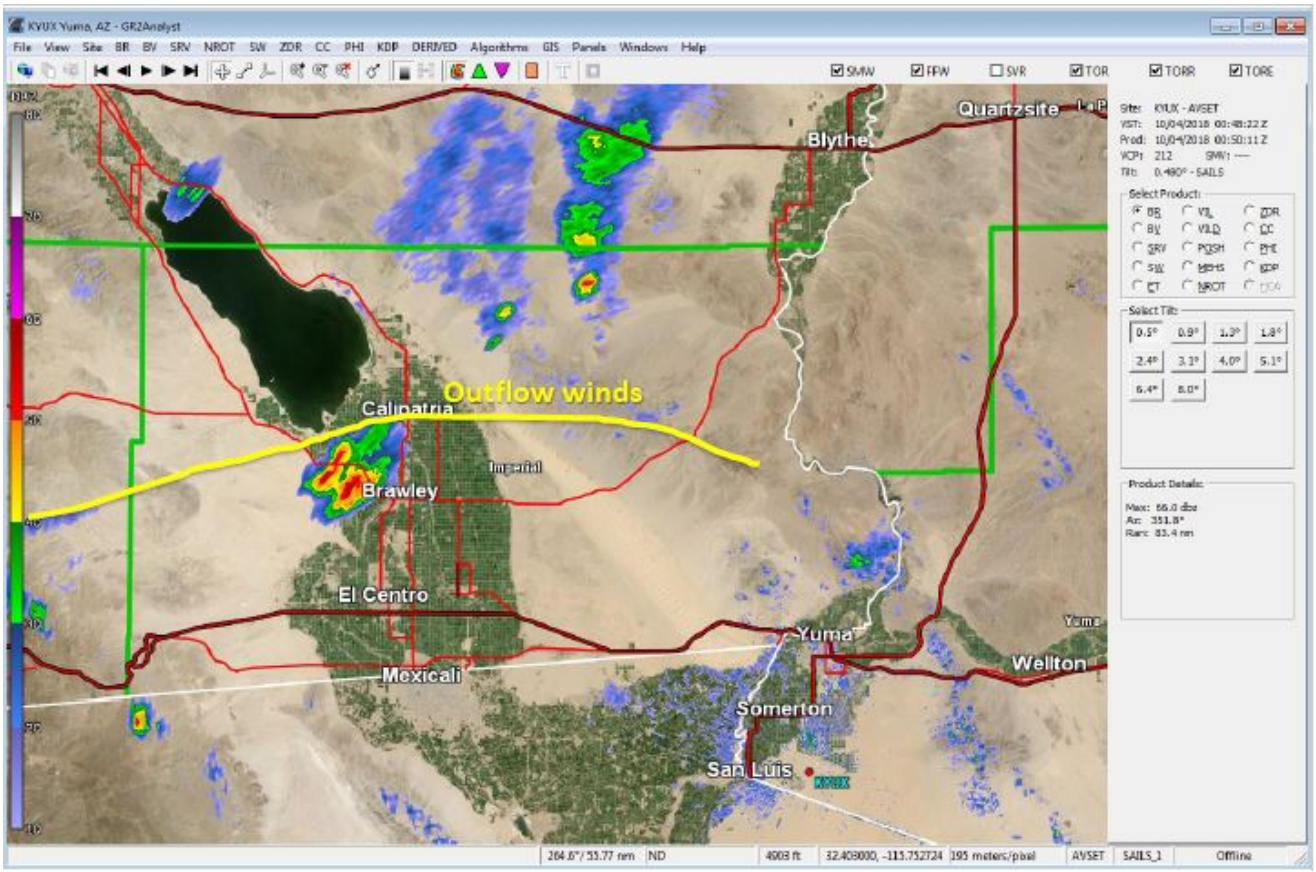


Fig 3-1: A gust front/outflow boundary of a severe thunderstorm in the vicinity of the Westmorland monitor coincident with elevated PM_{10} concentrations. Image courtesy of Andrew Deemer at the Phoenix NWS office

FIGURE 3-2
KYUX RADAR FOR OCTOBER 3, 2018 1654 PST

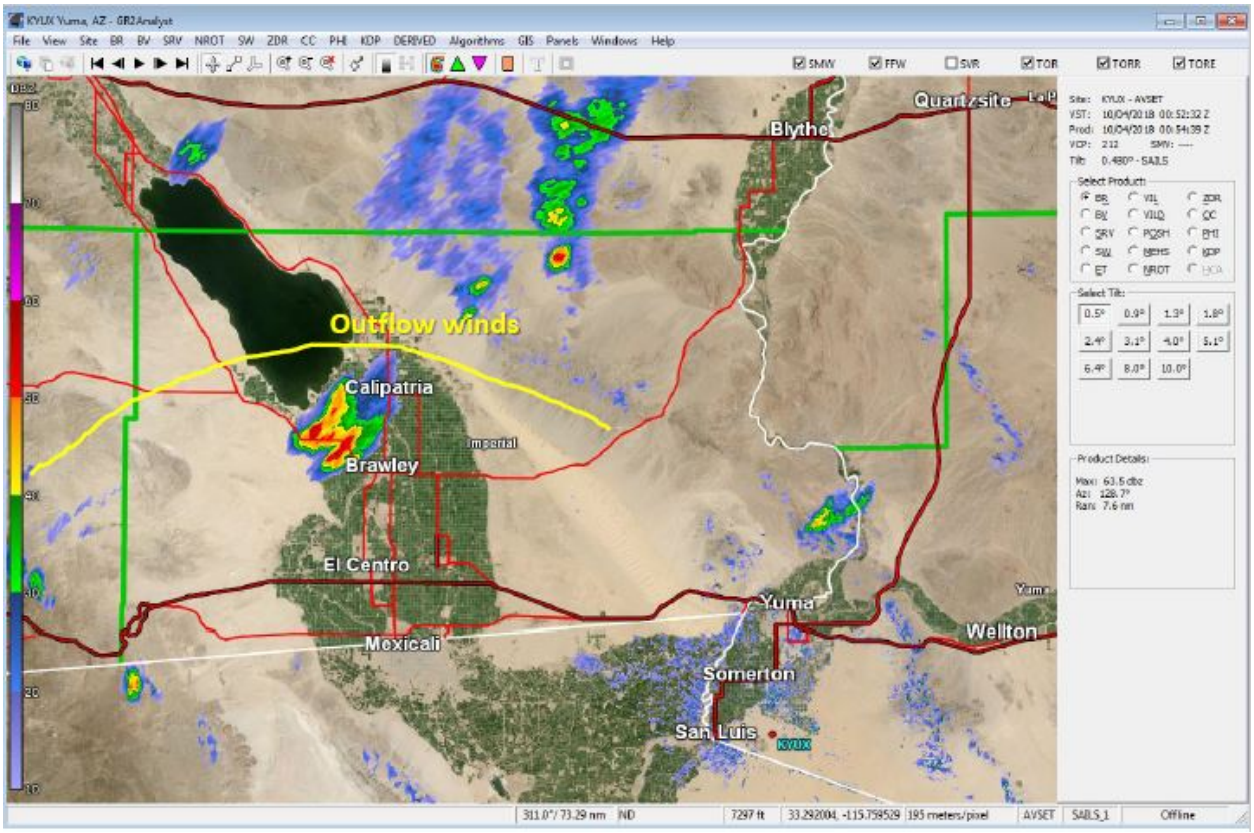


Fig 3-2: A gust front/outflow boundary of a severe thunderstorm in the vicinity of the Westmorland monitor coincident with elevated PM_{10} concentrations. Image courtesy of Andrew Deemer at the Phoenix NWS office

FIGURE 3-3
KYUX RADAR FOR OCTOBER 3, 2018 1706 PST

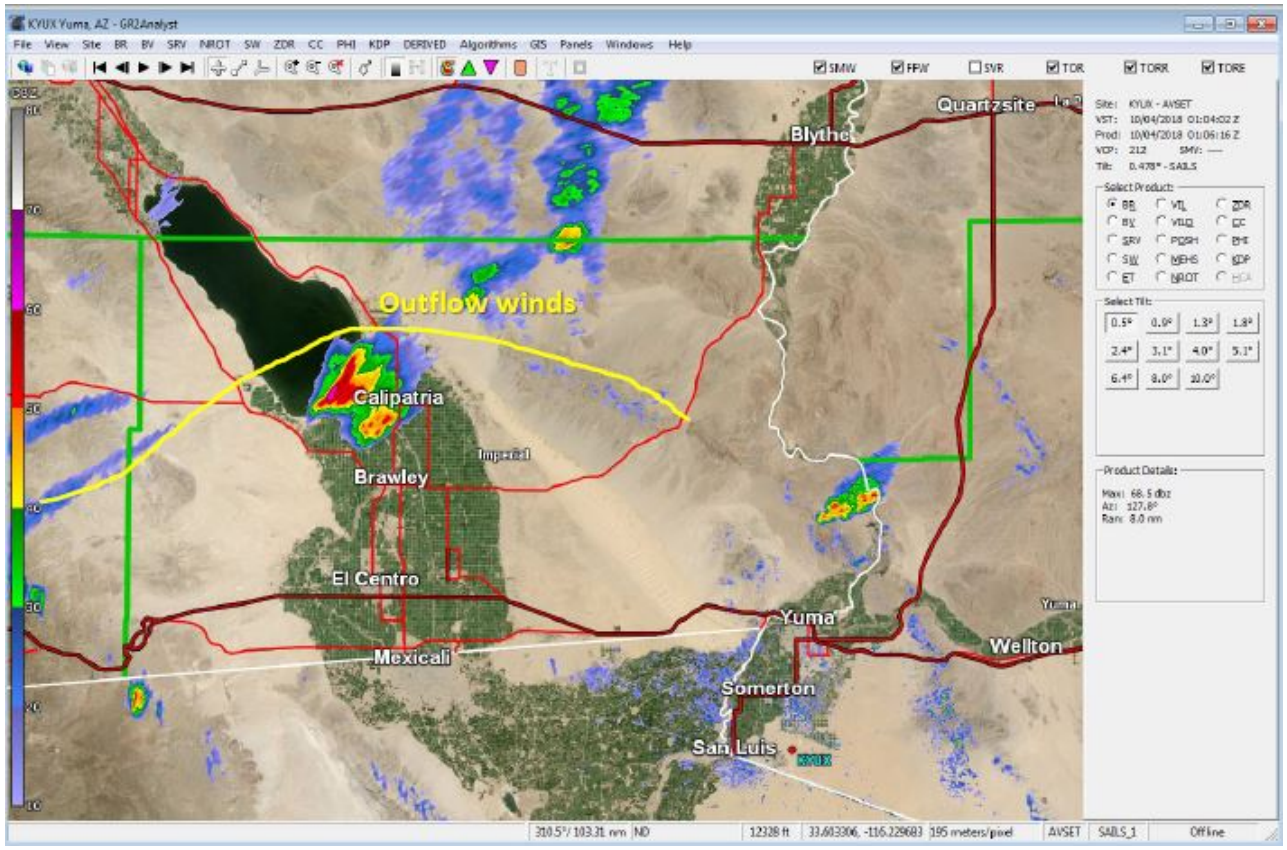


Fig 3-3: A gust front/outflow boundary of a severe thunderstorm in the vicinity of the Westmorland monitor coincident with elevated PM_{10} concentrations. Image courtesy of Andrew Deemer at the Phoenix NWS office

Figure 3-4 below provides an illustration of some of the meteorological conditions as described above and demonstrated in the HYSPLITS, for October 3, 2018, which affected air quality in Imperial County causing an exceedance at the Westmorland monitor.

FIGURE 3-4
VISUAL RAMP-UP ANALYSIS AS DISCUSSED FOR OCTOBER 3, 2018

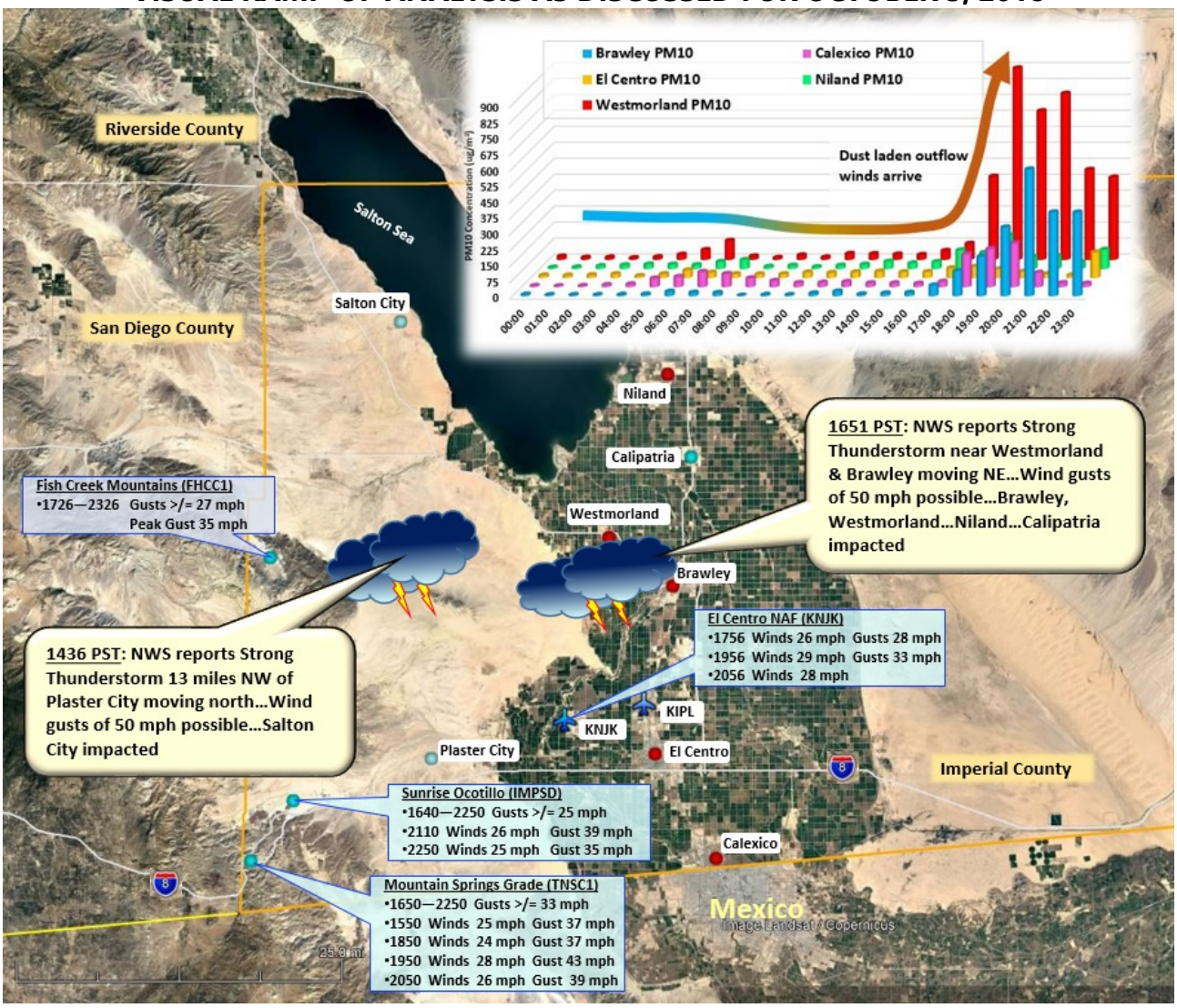


Fig 3-4: On October 3, 2018, thunderstorms over Imperial County produced short-lived but powerful outflow winds that transported dust into Imperial County. NWS Advisory (**Appendix A**) notices identified severe thunderstorms over Imperial County in the vicinity of the Westmorland monitor. Google Earth 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.[19] Regionally, the Blythe Airport (KBLH)

[19] 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

and the Yuma MCAS (KNYL) in southwestern Arizona reported reduced visibility coincident with elevated wind speeds, wind gusts and elevated hourly concentrations of particulates at all air quality monitors. Neither El Centro NAF (KNJK) nor Imperial County Airport (KIPL) reported reduced visibility on October 3, 2018. **Figure 3-5** and **Tables 3-1 and 3-2** provide information regarding the reduced visibility regionally and the relation to hourly concentrations at local air monitors.

While **Figure 3-5** is a graphical representation of the reduced visibility within Imperial County and surrounding areas, **Tables 3-1 through 3-2** provide a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM_{10} concentrations at the Westmorland monitor. Together, the data provides the supporting relationship between the elevated winds, blowing dust and reduced visibility (if applicable).

As mentioned above, neither the El Centro NAF or Imperial Airports reported reduced visibility however, compiled information found in **Figure 3-5,** indicated that visibility reduced at KBLH and KNYL indicating at minimum the presence of suspended particulates regionally.

FIGURE 3-5
72-HOUR TIME SERIES PM_{10} CONCENTRATIONS AND VISIBILITY

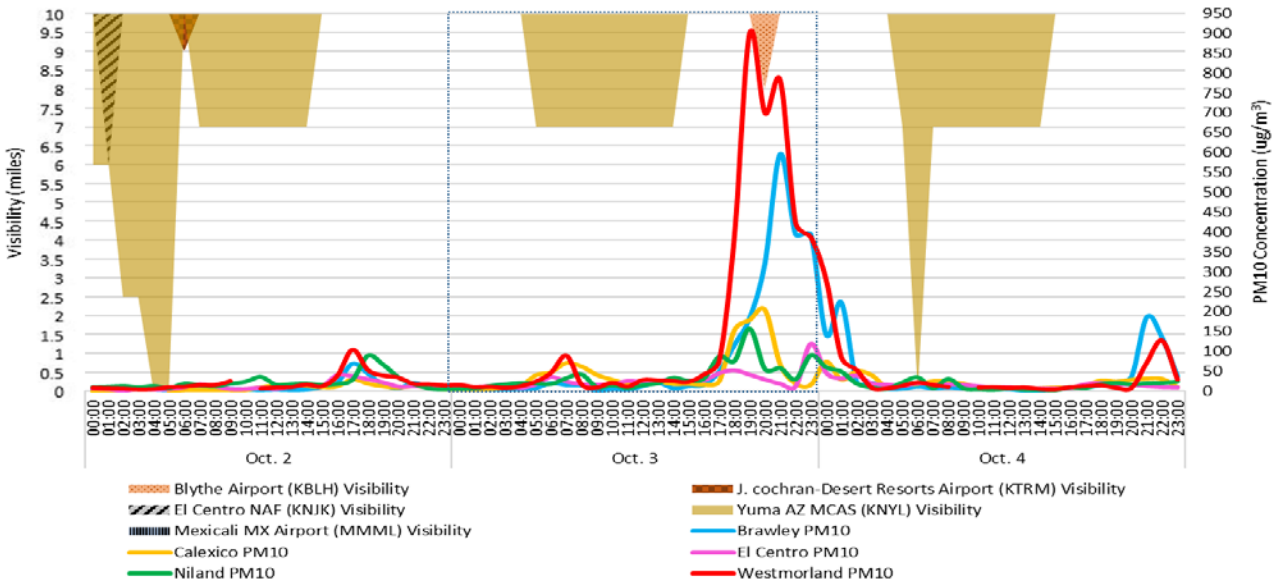


Fig 3-5: is a graphical representation of the compiled data from local and surrounding airports. Reported reduced visibility is coincident with elevated winds and hourly levels of concentrations either just prior to peak concentrations or after. Visibility data from the NCEI's QCLCD data bank https://www.ncdc.noaa.gov/

Because the EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states[20] the **Tables 3-1 through 3-2** are provided in support of the relationship between the elevated winds and elevated concentrations. In each table the measured elevated concentrations of PM_{10} either follow or occur during periods of elevated winds or gusts. Each table has a select group of meteorological sites that compare the hourly winds with the closest measured hourly concentration at each of the exceeding monitor(s).

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

	MOUNTAIN SPRINGS GRADE (TNSC1)			SUNRISE-OCOTILLO (IMPSD)			EL CENTRO NAF (KNJK)			IMPERIAL COUNTY AIRPORT (KIPL)			FISH CREEK MOUNTAINS (FHCC1)			WESTMORLAND
HR	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	PM_{10} (µg/m³)
0000	19	29	213	14	25	251				7		270	12	18	203	15
0100	17	25	208	12	22	251				8		270	11	17	200	10
0200	20	28	216	11	16	246				8		280	10	16	208	11
0300	15	26	209	8	14	260				9		280	10	16	212	8
0400	14	27	206	7	14	263	8		290	9		280	10	16	211	12
0500	14	27	205	6	13	269	11		280	9		290	8	13	198	24
0600	13	22	199	3	6	116	9		260	5		220	6	10	194	46
0700	16	25	207	9	14	242	6		180	6		250	10	14	186	89
0800	11	25	204	13	21	239	8		160	7		200	2	12	282	16
0900	11	19	220	11	18	233	7		130	5		VRB	11	23	204	9
1000	7	18	128	7	14	265	8		130	0		0	12	21	224	21
1100	6	11	116	7	14	112	8	20	120	10		150	10	21	218	11
1200	6	12	100	8	17	115	16		130	11	24	170	7	14	108	28
1300	7	12	77	10	16	132	10	21	140	15		130	8	17	97	27
1400	11	20	220	7	13	117	13		140	9	21	140	8	17	99	25
1500	18	24	216	16	24	238	9		170	14		150	8	28	107	23
1600	22	33	217	17	30	247	14		260	8		160	8	15	130	42
1700	25	37	220	16	27	248	26	28	250	16		260	16	30	202	75
1800	24	37	220	21	32	243	23		270	14		270	16	32	226	391
1900	28	43	219	21	35	247	29	33	250	14		270	16	30	217	900
2000	26	39	204	13	25	264	28		250	13		280	19	27	227	699
2100	19	37	207	26	39	244	22		260	14	22	260	19	37	213	781
2200	15	35	217	25	35	242	18	30	260	14		260	17	35	218	423
2300	15	27	227	10	24	269	9		250	17	26	260	20	31	217	387

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 data for El Centro NAF (KNJK) and Imperial County Airport (KIPL) from the NCEI's QCLCD data bank https://www.ncdc.noaa.gov/. Air quality data from the EPA's AQS repository. 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.

[20] "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 OCTOBER 3, 2018

	MOUNTAIN SPRINGS GRADE (TNSC1)			SUNRISE-OCOTILLO (IMPSD)			EL CENTRO NAF (KNJK)			IMPERIAL COUNTY AIRPORT (KIPL)			FISH CREEK MOUNTAINS (FHCC1)			WESTMORLAND	BRAWLEY
HR	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	PM_{10} (µg/m³)	PM10 (µg/m3)
0000	19	29	213	14	25	251				7		270	12	18	203	15	7
0100	17	25	208	12	22	251				8		270	11	17	200	10	5
0200	20	28	216	11	16	246				8		280	10	16	208	11	5
0300	15	26	209	8	14	260				9		280	10	16	212	8	5
0400	14	27	206	7	14	263	8		290	9		280	10	16	211	12	6
0500	14	27	205	6	13	269	11		280	9		290	8	13	198	24	8
0600	13	22	199	3	6	116	9		260	5		220	6	10	194	46	21
0700	16	25	207	9	14	242	6		180	6		250	10	14	186	89	16
0800	11	25	204	13	21	239	8		160	7		200	2	12	282	16	15
0900	11	19	220	11	18	233	7		130	5		VRB	11	23	204	9	2
1000	7	18	128	7	14	265	8		130	0		0	12	21	224	21	6
1100	6	11	116	7	14	112	8	20	120	10		150	10	21	218	11	5
1200	6	12	100	8	17	115	16		130	11	24	170	7	14	108	28	13
1300	7	12	77	10	16	132	10	21	140	15		130	8	17	97	27	22
1400	11	20	220	7	13	117	13		140	9	21	140	8	17	99	25	8
1500	18	24	216	16	24	238	9		170	14		150	8	28	107	23	13
1600	22	33	217	17	30	247	14		260	8		160	8	15	130	42	16
1700	25	37	220	16	27	248	26	28	250	16		260	16	30	202	75	50
1800	24	37	220	21	32	243	23		270	14		270	16	32	226	391	117
1900	28	43	219	21	35	247	29	33	250	14		270	16	30	217	900	185
2000	26	39	204	13	25	264	28		250	13		280	19	27	227	699	323
2100	19	37	207	26	39	244	22		260	14	22	260	19	37	213	781	596
2200	15	35	217	25	35	242	18	30	260	14		260	17	35	218	423	394
2300	15	27	227	10	24	269	9		250	17	26	260	20	31	217	387	393

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 data for El Centro NAF (KNJK) and Imperial County Airport (KIPL) from the NCEI's QCLCD data bank https://www.ncdc.noaa.gov/. Air quality data from the EPA's AQS repository. 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, the NWS Phoenix office issued Special Weather Statements, Significant Weather Statements, Severe Thunderstorm Warnings, and forecasts that described the gusty southwest to west winds for the region extending from the San Diego County Mountains and deserts, Imperial County, and western Arizona. As thunderstorms developed under unstable atmospheric conditions producing gusty outflow winds, the gusty southwest to west winds affected different regional air monitors in Imperial County (**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.[21] As transported windblown dust entered Imperial County on October 3, 2018 air quality degraded throughout Imperial County.

[21] 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

Overall, the gusty westerly winds produced by the outflow winds from severe thunderstorms affected air quality in Imperial County.

FIGURE 3-6
IMPERIAL VALLEY AIR QUALITY INDEX FOR WESTMORLAND
OCTOBER 3, 2018

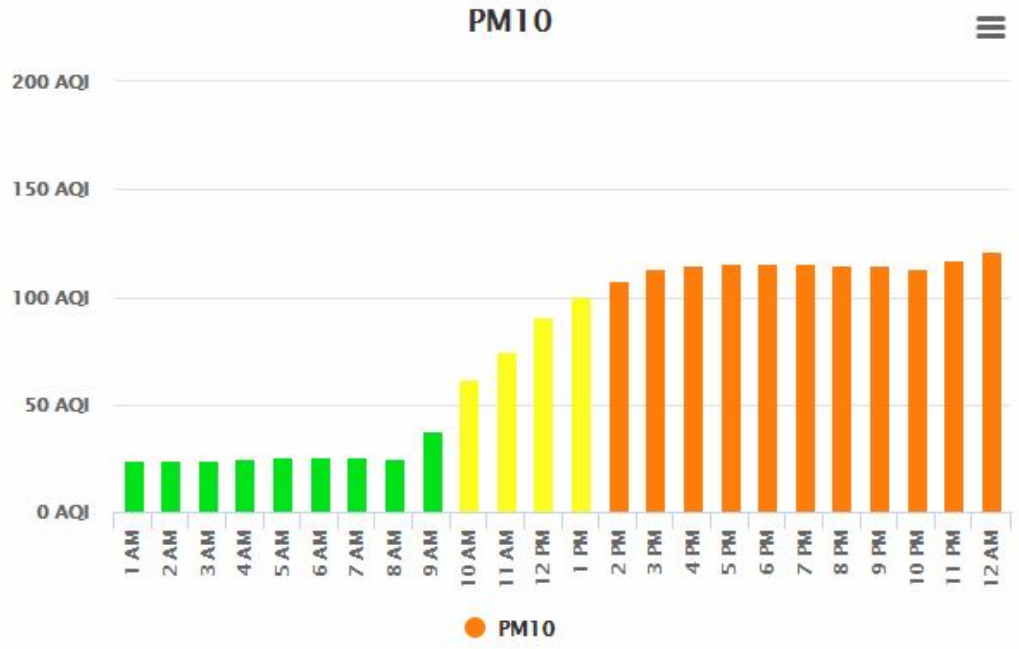


Fig 3-6: The degradation, or affect upon air quality, maybe determined when the AQI changes from a "Green" or Good to an "Orange" or a level that is Unhealthy for sensitive groups

III.1 Summary of Forecasts and Warnings

Both of the San Diego and Phoenix NWS offices discussed in the days prior to and during October 3, 2018 the effects of Tropical Storm Rosa as it moved north out of northern Mexico and the effects of the approaching low-pressure system. Of all the Special Weather Statements, Significant Weather Statements and Severe Thunderstorm Warnings issued on October 3, 2018 two critically important notices were issued during the October 3, 2018 event. These concerned strong thunderstorms in the western portion of Imperial County in the vicinity of the Westmorland monitor coincident to measured elevated hourly concentrations.[22,23] **Appendix A** contains all pertinent NWS notices.

[22] National Weather Service, Special Weather Statement, October 3, 2018, Phoenix office, 336pm MST
[23] National Weather Service, Special Weather Statement, October 1, 2018, Phoenix office, 551pm MST

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 October 3, 2018 the El Centro NAF (KNJK) measured winds at or above 25 mph.

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 and 4-2 show the time series of available FRM and BAM 24-hr PM_{10} concentrations at the Westmorland air quality monitor for the period of January 1, 2010 through October 3, 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).[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 PM_{10} concentrations, between January 1, 2010 and October 3, 2018, as measured by the Westmorland monitor, was used to establish the historical and seasonal variability over time.[25] All figures illustrate that the exceedance, which occurred on October 3, 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.

[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 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.

[25] FRM sampling ended December 2016.

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

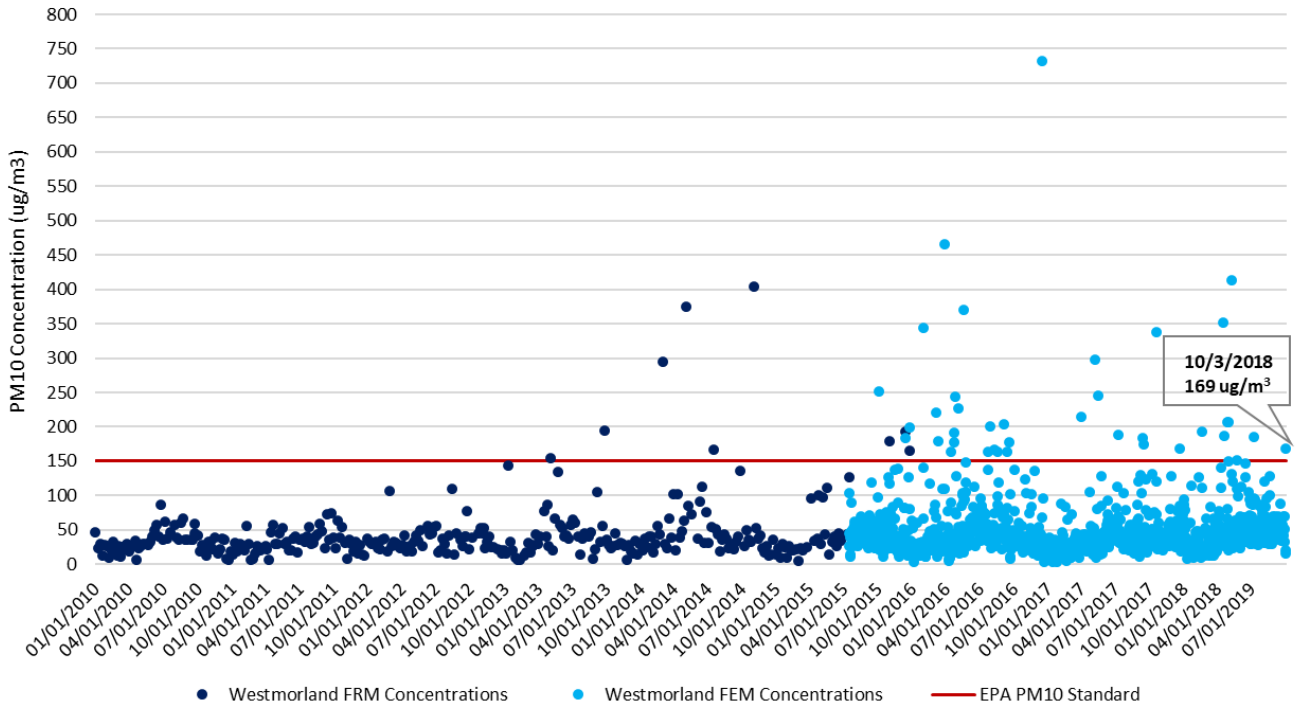
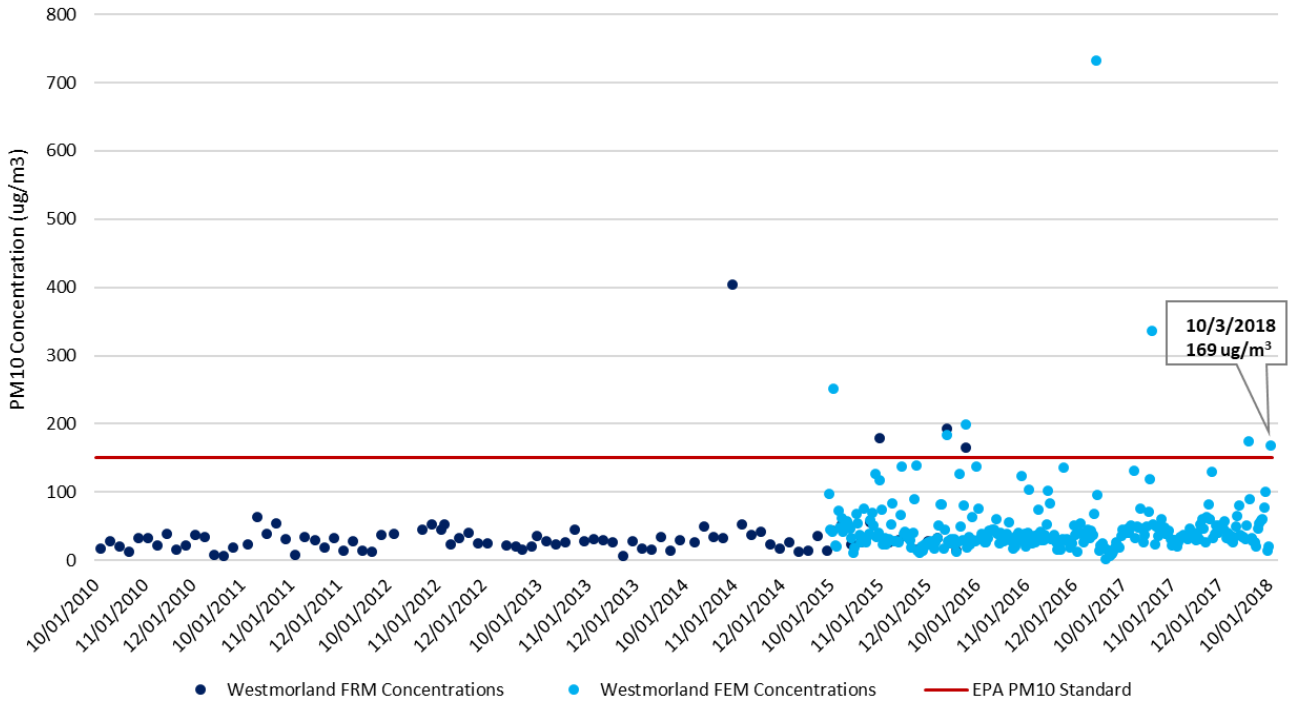


Fig 4-1: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 169 µg/m^3 on October 3, 2018 by the Westmorland monitor was outside the normal historical concentrations when compared to similar event days and non-event days

The time series, **Figure 4-1,** for Westmorland includes 1,527 sampling days (January 1, 2010 through October 3, 2018). During the January 1, 2010 through October 3, 2018 period, the Westmorland monitor measured 44 exceedance days out of 1,527 sampling days, which translates into an occurrence rate less than 3%. Historically, there seven (7) exceedance days measured during the first quarter; fifteen (15) exceedance days measured during the second quarter; thirteen (13) exceedance days measured during the third quarter; and nine (9) exceedance days measured during the fourth quarter.

FIGURE 4-2
WESTMORLAND SEASONAL COMPARISON
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
***OCTOBER 1, 2010 TO OCTOBER 3, 2018**



***Quarterly: October 1, 2010 to December 31, 2017 and October 1, 2018 to October 3, 2018**
Fig 4-2: A comparison of PM_{10} seasonal concentrations demonstrate that the measured concentration of 169 µg/m^3 by the Westmorland monitor on October 3, 2018 was outside the normal seasonal concentrations when compared to similar days and non-event days

Figure 4-2 illustrates the seasonal fluctuations over a period of 358 sampling days, 369 credible samples and nine (9) exceedance days. This translates to a 2.4% seasonal exceedance occurrence rate.

Examining the historical and seasonal time series concentrations as they relate to the October 3, 2018 measured exceedances, the exceedances measured on October 3, 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, the natural open deserts to the west and south (in Mexico) of Imperial County. However, the most significant contribution from these emissions that affected the Brawley and Westmorland air quality monitors occurred from thunderstorm activity, mixing and moving emissions northeastward on October 3, 2018. In any event, Imperial County does not have jurisdiction over emissions emanating from San Diego County or Mexico therefore 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

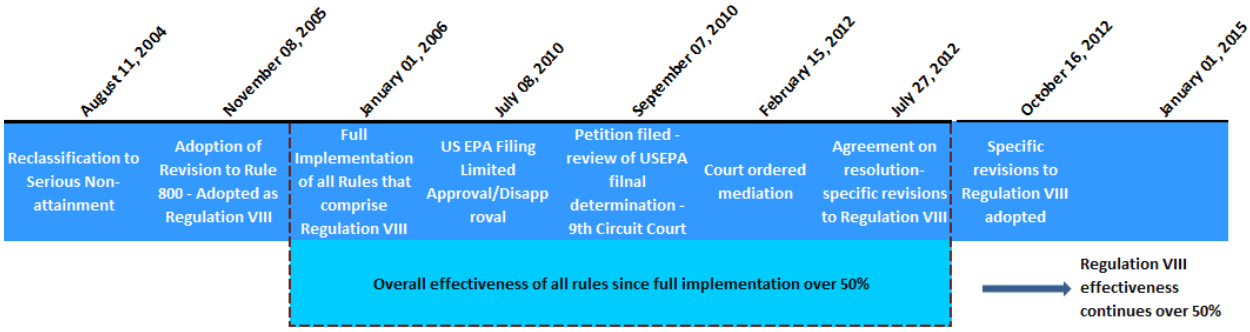


Fig 5-1: Regulation VIII Graphic Timeline

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 October 3, 2018 the El Centro NAF (KNJK) measured wind speeds at or above 25 mph. Wind speeds of 25 mph are normally sufficient to overcome most PM_{10} control measures. During the October 3, 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 Westmorland monitor during the October 3, 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

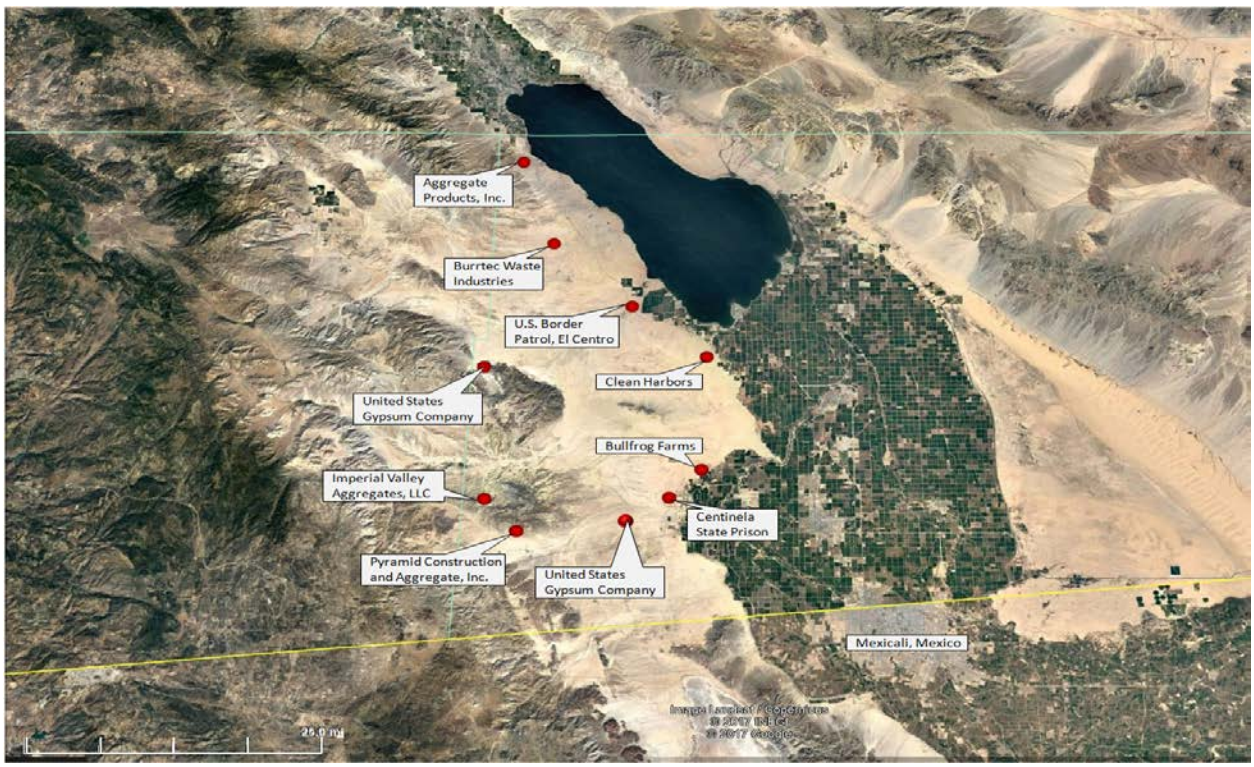


Fig 5-2: The above map identifies those permitted sources located west, northwest and southwest of the Westmorland monitor. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States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

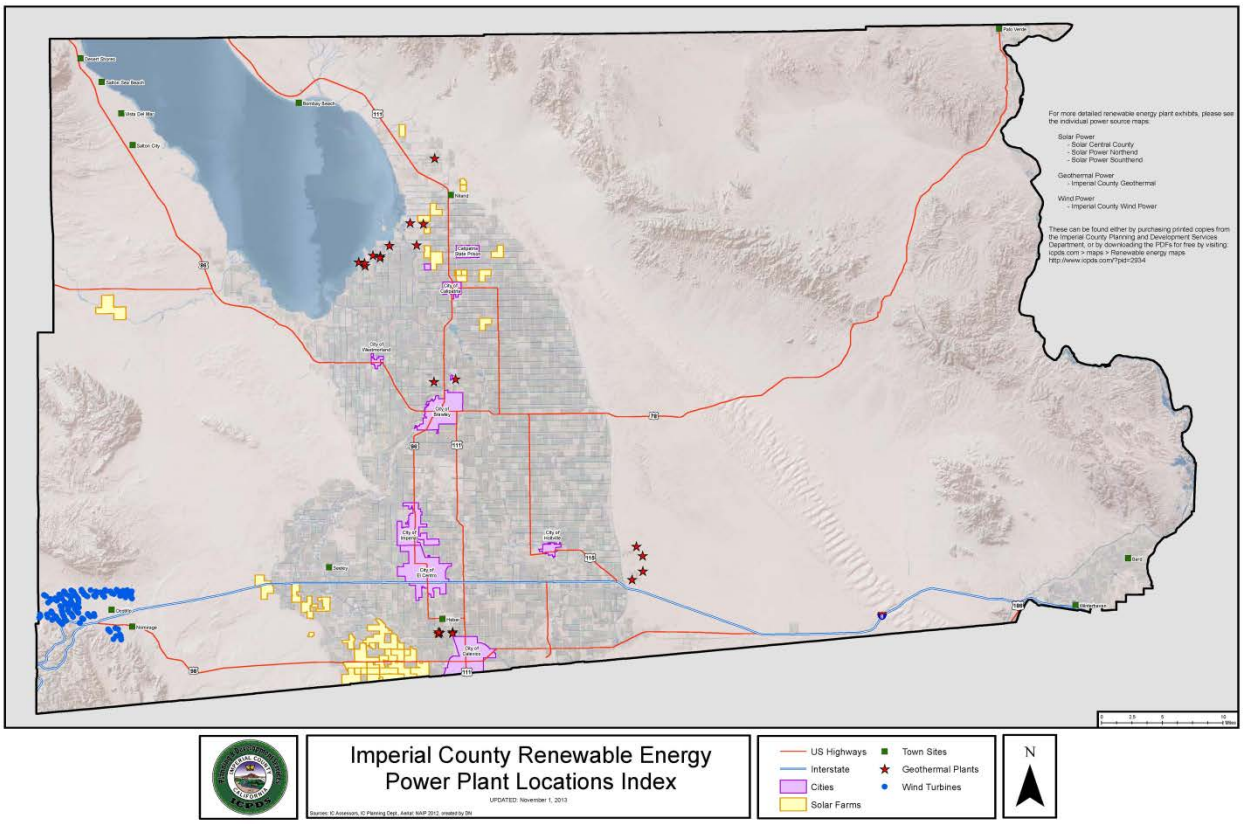


Fig 5-3: The above map identifies those power sources located west, northwest and southwest of the Westmorland monitor. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

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.

There was nothing typical about the October 3, 2018 event. Here, there were two systems (tropical storm Rosa and an approaching low-pressure system) influencing each other creating sufficient instability in the atmosphere so as to create thunderstorms that generated and transported fugitive emissions in Imperial County causing an exceedance at the Westmorland monitor. The Westmorland monitor was closest to and directly in the path of the gusty outflow winds which caused an exceedance of the PM_{10} NAAQS. Finally, the intensity of the gusty westerly winds was sufficient to overcome reasonable controls in place in Imperial County.

VI.1 Affects Air Quality

The preamble to the revised EER states that an event is considered to have affected air quality if it can be demonstrated that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation. Given the information presented in this demonstration, particularly Section III, we can reasonably conclude that there exists a clear causal relationship between the monitored exceedance and the October 3, 2018 event, which changed or affected air quality in Imperial County.

VI.2 Not Reasonably Controllable or Preventable

In order for an event to be defined as an exceptional event under section 50.1(j) of 40 CFR Part 50 an event must be "not reasonably controllable or preventable." The revised preamble explains that the nRCP has two prongs, not reasonably preventable and not reasonably controllable. The nRCP is met for natural events where high wind events entrain dust from desert areas, whose sources are reasonably controlled, 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 San Diego County Mountains and deserts and to a lesser degree from within Mexico 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 Westmorland monitor was caused by naturally occurring gusty outflow 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 and southwest of Imperial County. These facts provide strong evidence that the PM_{10} exceedance at the

Westmorland monitor on October 3, 2018, was not reasonably controllable or preventable.

VI.3 Natural Event

The revised preamble to the EER clarifies that a "Natural Event" (50.1(k) of 40 CFR Part 50) is an event with its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. Anthropogenic sources that are reasonably controlled are considered not to play a direct role in causing emissions. As discussed within this demonstration, the PM_{10} exceedance that occurred at the Westmorland monitor on October 3, 2018, was caused by the transport of windblown dust into Imperial County by strong gusty westerly winds produced by thunderstorm outflows caused by a monsoonal like conditions. 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 Westmorland monitor in Imperial County demonstrates a consistency of elevated gusty westerly winds with elevated concentrations of PM_{10} on October 3, 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 October 3, 2018.

VI.5 Concentration to Concentration Analysis

The historical annual and seasonal 24-hr average PM_{10} measured concentrations at the Westmorland monitor 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 outflow westerly winds that developed as a result of thunderstorms. The information provides a clear causal relationship between the entrained windblown dust and the PM_{10} exceedance

measured at the Westmorland air quality monitor in Imperial County on October 3, 2018.

In particular, the clear causal relationship and not reasonably controllable or preventable sections provide evidence that high gusty westerly winds transported fugitive emissions from open natural Mountain and desert areas, located within San Diego County, Mexico and Imperial County (all part of the Sonoran Desert). In addition, because anthropogenic sources in upwind areas were reasonably controlled at the time of the event, this event meets the definition of a Natural Event.[26]

[26] 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.