IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

Mount Laguna was hit with a snow storm on May 8, 2015 -- yes, in May. NBC 7's Elena Gomez speaks with visitors who were pleasantly surprised by the snowy conditions. (Published Friday, May 8, 2015)

May 7, 2015
Exceptional Event Documentation
For the Imperial County PM_{10} Nonattainment Area

FINAL REPORT

November 1, 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)
HF	Historical Fluctuations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
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)
LST	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

On May 7, 2015, the State and Local Ambient Air Monitoring Station (SLAMS) (AQS Site Code 06-025-4004), located in Niland, California measured an exceedance of the National Ambient Air Quality Standard (NAAQS) when the Federal Equivalent Method (FEM), Beta Attenuation Monitor Model 1020 (BAM 1020) measured a (midnight to midnight) 24-hr average Particulate Matter less than 10 microns (PM_{10}) concentration of 210.2µg/m^3. PM_{10} 24-hr measurements measured above the 150µg/m^3 are exceedances of the NAAQS. The SLAMS in Niland was the only station in Imperial County to measure an exceedance of the PM_{10} NAAQS on April 24, 2015.

TABLE 1-1
CONCENTRATIONS OF PM_{10} ON *MAY 6, 2015 and May 7, 2015

DATE	MONITORING SITE	AQS ID	POC(s)	HOURS	24-HOUR CONCENTRATION µg/m^3	PM_{10} NAAQS µg/m^3
5/7/2015	**Niland**	**06-025-4004**	**3**	**24**	**210.2**	**150**
5/6/2015	Niland	06-025-4004	1	24	90	150
5/6/2015	Niland	06-025-4004	3	24	117.7	150
5/6/2015	Brawley	06-025-0007	1	24	61	150
5/6/2015	Brawley	06-025-0007	3	24	73.9	150
5/6/2015	Westmorland	06-025-4003	1	24	97	150
5/6/2015	El Centro	06-025-1003	1	24	29	150
5/7/2015	Brawley	06-025-0007	3	24	127.8	150
5/7/2015	**Calexico	06-025-0005	1	24	134	150

*All time referenced throughout this document is in Pacific Standard Time (PST) unless otherwise noted[1]
**May 7, 2015 was not a scheduled run day, Calexico FRM concentration is a makeup run

The Imperial County Air Pollution Control District (ICAPCD) has been submitting PM_{10} data from FRM SSI instruments since 1986 into the United States Environmental Protection Agency's (USEPA) Air Quality System (AQS). Prior to 2013 all continuous measured PM_{10} data was considered non-regulatory, thus measured in local conditions. However, by 2013 ICAPCD began formally submitting continuous FEM PM_{10} data from BAM 1020's into the USEPA managed AQS. Reporting in standard conditions is required by USEPA when data is considered for regulatory purposes. Thus all continuous PM_{10} data since 2013 is regulatory. On May 7, 2015 the Niland monitor was impacted by elevated particulate matter caused by the entrainment of fugitive windblown dust from strong westerly winds associated with the passage of a Pacific weather disturbance (storm) which was enhanced by the presence of a strong upper level trough that moved through southern California and into Imperial County.

This report demonstrates that the exceedance observed on May 7, 2015 was caused by a

[1] According to the National Institute of Standards and Technology (NIST) Time and Frequency Division the designation of the time of day for specific time zones are qualified by using the term "standard time" or "daylight time". For year-round use the designation can be left off inferring "local time" daylight or standard whichever is present. For 2015 Pacific Daylight Time (PDT) is March 8 through October 31. https://www.nist.gov/pml/time-and-frequency-division/local-time-faqs#intl

naturally occurring event which elevated particulate matter affecting air quality, has concentration to concentration monitoring site analyses supporting the clear causal relationship between the event and the monitored exceedance affecting air quality, was not reasonably controllable or preventable (nRCP), and would not have occurred without the entrainment of fugitive windblown dust from outlying deserts and mountains within the Sonoran Desert. The document further substantiates the request by the ICAPCD to exclude the PM_{10} 24-hour NAAQS exceedance of 210.2µg/m^3 as an exceptional event. This demonstration substantiates that this event meets the definition of the USEPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER)[2].

I.1 Demonstration Contents

Section II - Describes the May 7, 2015 event as it occurred in California and into Imperial County, providing background information of the exceptional event and explaining how the wind driven emissions from the event led to the exceedance at the Niland monitor.

Section III – Using time-series graphs, summaries and historical concentration comparisons of the Niland station this section discusses and establishes how the May 7, 2015 event affected air quality such that a clear causal relationship is demonstrated between the event and the monitored exceedance. It is perhaps of some value to mention that the time-series graphs include PM_{10} data measured both in local conditions and standard conditions. Prior to 2013 PM_{10} continuous data is measured in local conditions, all other data is in standard conditions. The concentration difference between local and standard conditions has an insignificant impact on any data analysis. Overall, this section provides the evidence that human activity played little or no direct causal role in the May 7, 2015 event and its resulting emissions defining the event as a "natural event".[3]

Section IV - Provides evidence that the event of May 7, 2015 was not reasonably controllable or preventable despite the full enforcement and implementation of Best Available Control Measures (BACM).

Section V - Brings together the evidence presented within this report to show that the exceptional event affected air quality; that the event was not reasonably controllable or preventable; that there was a clear causal relationship between the event and the exceedance, and that the event was a natural event.

I.2 Requirement of the Exceptional Event Rule

The above sections combined comprise the technical requirements described under the

[2] "Treatment of Data Influenced by Exceptional Events; Final Rule", 72 FR 13560, March 22, 2007

[3] 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.

Exceptional Events Rule (EER) under 40 CFR §50.14(c)(3)(iv). However, there are additional non-technical requirements that must be met in order for the USEPA to concur with flagged air quality monitoring data.

I.2.a Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

The ICAPCD and the National Weather Service (NWS) provided notification via the ICAPCD's webpage that winds 25 to 30 mph and gust to 45 miles per hour (mph) could impact this region potentially elevating particulate matter. Because of the potential for suspended particles and poor air quality, the ICAPCD issued a "No Burn" day in Imperial County. In addition, the ICAPCD posted the notices issued by the National Weather Service (NWS) Phoenix office warning of potential blowing dust and sand. **Appendix A** contains copies of notices as they were issued during the early morning of May 7, 2015.

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

States are required under federal regulation to submit measured ambient air quality data into the AQS. AQS is the federal repository of Quality Assured and Quality Controlled (QA/QC) ambient air data used for regulatory purposes. 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 is accomplished by flagging the data in AQS and providing an initial event description. On October 3, 2016, the US EPA promulgated revisions to the Exceptional Events rule which included the requirement of an "Initial Notification of Potential Exceptional Event" (INPEE) process. This revised INPEE process requires communication between the US EPA regional office and the State, prior to the development of a demonstration. The intent of the INPEE process is twofold: to determine whether identified data may affect a regulatory decision and whether a State should develop/submit an EE Demonstration. Although the development of the May 7, 2015 demonstration preceded the promulgation of the INPEE process the ICAPCD has communicated with the State and US EPA regarding the development and submittal of this EE demonstration.

The ICAPCD made a written request to the California Air Resources Board (CARB) to place preliminary flags on SLAMS measured concentrations in Niland. The request dated March 07, 2016 requested the placement of an initial flag upon the Niland BAM 1020 measurement of 210.2µg/m^3. Subsequently, after submittal of the request, a correction to the original request was sent to CARB correcting FEM data measurements originally submitted in local conditions to standard conditions. Reporting in standard conditions is required by US EPA when data is considered for regulatory purposes. **Table 1-1** above provides the corrected concentrations for Niland. The difference in concentrations has an insignificant impact on any data analysis. A brief description of the meteorological conditions was provided to CARB which provided preliminary information that indicated a potential natural event had occurred on May 7, 2015.

I.2.c Documentation that the public comment process was followed for the event demonstration that was flagged for exclusion (40 CFR §50.14(c)(3)(v))

The ICAPCD posted, for a 30 day public review, a draft version of this demonstration on the ICAPCD webpage and published a notice of availability in the Imperial Valley Press on September 29, 2017. The notice advised the general public that comments were being solicited regarding this demonstration which supports the request, by the ICAPCD, to exclude the measured concentration of 210.2µg/m^3 which occurred on May 7, 2015 in Niland. The final closing date for comments was November 1, 2017. **Appendix A** contains a copy of the public notice affidavit along with any comments received by the ICAPCD for submittal as part of the demonstration (40 CFR §50.14(c)(3)(i)).

I.2.d Documentation submittal supporting an Exceptional Event Flag (40 CFR §50.14(c)(3)(i))

States that have flagged data as a result of an exceptional event and who have requested an exclusion of said flagged data are required to submit a demonstration that justifies the data exclusion to the USEPA in accordance with the due date established by USEPA during the INPEE process (40 CFR §50.14(c)(2)(i)). As explained above, this EE demonstration was prepared prior to the promulgated revision on October of 2016 and while there is no specific due date there is an agreement between agencies, (CARB, USEPA and Imperial County) that the May 7, 2015 EE demonstration will be submitted in 2017 (40 CFR §50.14(c)(2)(i)(B)).

The ICAPCD, after the close of the comment period and after consideration of the comments will submit this demonstration along with all required elements, including received comments and responses to USEPA Region 9 in San Francisco, California. The submittal of the May 7, 2015 demonstration will have a regulatory impact upon the development and ultimate submittal of the PM_{10} State Implementation Plan for Imperial County in 2017

I.2.e Necessary demonstration to justify an exclusion of data under 40 CFR§50.14(c)(3)(iv)

A This demonstration provides evidence that the event, as it occurred on May 7, 2015 satisfies the definition in 40 CFR §50.1(j) and (k) for an exceptional event.

- a The event created the meteorological conditions that entrained emissions and caused the exceedance.
- b The event clearly “affects air quality” such that there is the existence of a clear causal relationship between the event and the exceedance.
- c Analysis demonstrates that the event influenced concentrations compared to concentrations at the same monitor at other times supports the clear causal relationship.
- d The event “is not reasonably controllable and not reasonably preventable.”
- e The event is “caused by human activity that is unlikely to recur at a particular location or [is] a natural event.”
- f The event is a “natural event” where human activity played little or no direct causal role.

B This demonstration provides evidence that air quality was affected by the exceptional event in Imperial County. There is a clear causal relationship between the event and the measured concentration in Niland supporting that the event affected the air quality in Imperial County.

C This demonstration provides evidence of the event influenced monitor site measured concentrations to concentrations at the same monitor at other times supporting the clear causal relationship.

II May 7, 2015 Conceptual Model

This section provides a summary description of the meteorological and air quality conditions under which the May 7, 2015 event unfolded in Imperial County. The subsection elements include

- » A description and map of the geographic setting of the air quality and meteorological monitors
- » A description of Imperial County's climate
- » An overall description of meteorological and air quality conditions on the event day.

II.1 Geographic Setting and Monitor Locations

According to the United States Census Bureau, Imperial County has a total area of 4,482 square miles of which 4,177 square miles is land and 305 square miles is water. Much of Imperial County is below sea level and is part of the Colorado Desert an extension of the larger Sonoran Desert (**Figure 2-1)**.

FIGURE 2-1
COLORADO DESERT AREA IMPERIAL COUNTY

Fig 2-1: 1997 California Environmental Resources Evaluation System. According to the United States Geological Survey (USGS) Western Ecological Research Center the Colorado Desert bioregion is part of the bigger Sonoran Desert Bioregion which includes the Colorado Desert and Upper Sonoran Desert sections of California and Arizona, and a portion of the Chihuahuan Basin and Range Section in Arizona and New Mexico (Forest Service 1994)

A notable feature in Imperial County is the Salton Sea which is at 235 feet below sea level. The Chocolate Mountains are located east of the Salton Sea and extend in a northwest-southeast direction for approximately 60 miles (**Figure 2-2)**. In this region, the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect the northern-most extensions of the East Pacific rise. Consequently, the region is subject to earthquakes and the crust is being stretched, resulting in a sinking of the terrain over time.

FIGURE 2-2
SURROUNDING AREAS OF THE SALTON SEA

Fig 2-2: Image courtesy of the Image Science and Analysis Laboratory NASA Johnson Space Center, Houston Texas

All of the seven incorporated cities, including the unincorporated township of Niland, are surrounded by agricultural fields to the north, east, west and south (**Figure 2-3)**. Together, the incorporated cities, including Niland, and the agricultural fields make what is known as the Imperial Valley. Surrounding the Imperial Valley are desert areas found on the eastern and western portions of Imperial County.

The desert area, found within the western portion of Imperial County is of note because of its border with San Diego County. From west to east, San Diego County stretches from the Pacific Ocean to its boundary with Imperial County. San Diego County has a varied topography. On its western side is 70 miles (110 km) of coastline. Most of San Diego between the coast and the Laguna Mountains consists of hills, mesas, and small canyons. Snow-capped (in winter) mountains rise to the northeast, with the Sonoran Desert to the far east. Cleveland National

Forest is spread across the central portion of the county, while the Anza-Borrego Desert State Park occupies most of the northeast. The southeastern portion of San Diego County is comprised of distinctive Peninsular mountain ranges. The San Diego mountains and deserts comprise the eastern two-thirds of San Diego County and are primarily undeveloped back-county with a native plant community known as chaparral. Of the 9 major mountain ranges within San Diego County the In-Ko-Pah Mountains and the Jacumba Mountains border Mexico and Imperial County.

Both mountain ranges provide the distinctive weathered dramatic piles of residual boulders that can be seen while driving Interstate 8 from Imperial County through Devil's Canyon and In-Ko-Pah Gorge. Interstate 8 runs along the US border with Mexico from San Diego's Mission Bay to just southeast of Casa Grande Arizona.

FIGURE 2-3
JACUMBA PEAK

Fig 2-3: The Jacumba Mountains reach an elevation of 4,512 feet (1,375 m) at Jacumba Peak, near the southern end of the chain. Source: Wikipedia at https://en.wikipedia.org/wiki/Jacumba_Mountains

Northwest and northeast of the Jacumba Mountains is the Tierra Blanca Mountains, the Sawtooth Mountains and Anza-Borrego Desert State Park. Within the mountain ranges and the Anza-Borrego Desert State Park there exists the Vallecito Mountains, the Carrizo Badlands, the Carrizo Impact Area, Coyote Mountains and the Volcanic Hills to name of few. Characteristically, these areas all have erosion that has occurred over time that extends from the Santa Rosa Mountains into northern Baja California in Mexico. For example the Coyote Mountains consists of sand dunes left over from the ancient inland Sea of Cortez. Much of the terrain is still loose dirt, interspersed with sandstone and occasional quartz veins. The nearest community to the Coyote Mountain range is the community of Ocotillo. Of interest are the fossilized and hollowed out sand dunes that produce wind caves.

FIGURE 2-4
ANZA-BORREGO DESERT STATE PARK
CARRIZO BADLANDS

Fig 2-4: View southwest across the Carrizo Badlands from the Wind Caves in Anza-Borrego Desert State Park. Source: Wikipedia at https://en.wikipedia.org/wiki/Carrizo_Badlands

The Carrizo Badlands, which includes the Carrizo Impact Area used by the US Navy as an air-to-ground bombing range during World War II and the Korean War, lies within the Anza-Borrego Desert State Park. The Anza-Borrego Desert State Park is located within the Colorado Desert, is the largest state park in California occupying eastern San Diego County, reaching into Imperial and Riverside counties. The two communities within Anza-Borrego Desert State Park are Borrego Springs and Shelter Valley.

The Anza-Borrego Desert State Park lies in a unique geologic setting along the western margin of the Salton Trough. The area extends north from the Gulf of California to 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. The Anza-Borrego region changed gradually over time from intermittently being fed by the Colorado River Delta to dry lakes and erosion from the surrounding mountain ranges. The area located within the southeastern and northeastern section of San Diego County is a source of entrained fugitive dust emissions that impact Imperial County when westerly winds funnel through the unique landforms causing in some cases wind tunnels that cause increases in wind speeds.

FIGURE 2-5
ANZA-BORREGO DESERT STATE PARK
DESERT VIEW FROM FONT'S POINT

Fig 2-5: Desert view from Font's Point. Source: Font's Point Anza-Borrego Photographed by and copyright of (c) David Corby; Wikipedia at https://en.wikipedia.org/wiki/Anza-Borrego_Desert_State_Park

FIGURE 2-6
LOCATION AND TOPOGRAPHY OF IMPERIAL COUNTY

Fig 2-6: Depicts the seven incorporated cities within Imperial Valley - City of Calipatria, City of Westmorland, City of Brawley, City of Imperial, City of El Centro, City of Holtville, and the City of Calexico. Niland is unincorporated. Mexicali, Mexico is to the south

Furthermore, the deserts located to the east and west of Imperial County expand into Mexico (Sonoran Desert) (**Figure 2-7)**. Combined, these deserts are sources of dust emissions which impact the Imperial County during high wind events.

FIGURE 2-7
DESERTS IN CALIFORNIA, YUMA AND MEXICO

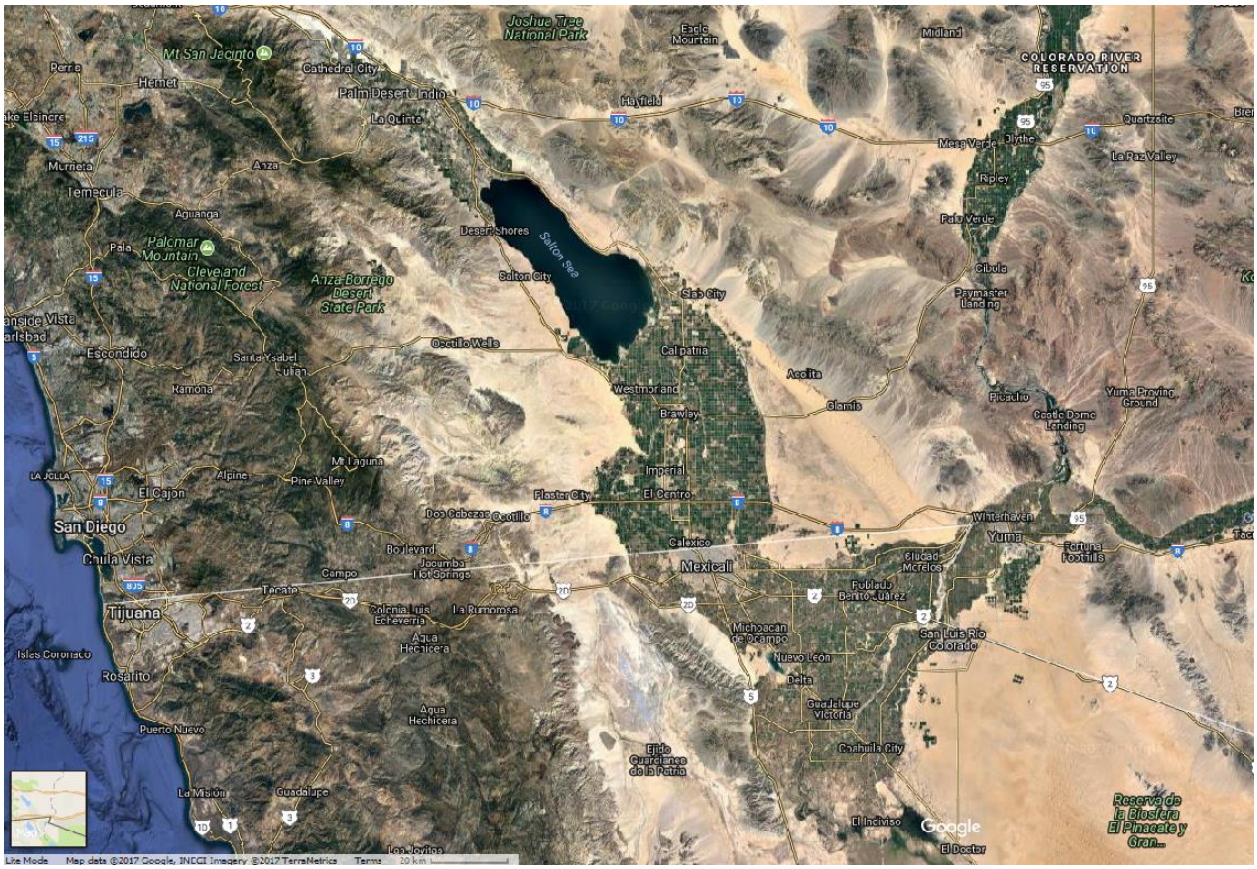


Fig 2-7: Depicts the Sonoran Desert as it extends from Mexico into Imperial County. Source: Google Earth Terra Matrics

The air quality and meteorological monitoring stations used in this demonstration are shown in **Figure 2-8**. Of the five SLAMS within Imperial County four stations measure both meteorological and air quality data. These SLAMS are located in Calexico, El Centro, Westmorland, and Niland; the station located in Brawley only measures air quality. Other air monitoring stations measuring air quality and meteorological data used for this demonstration include stations in eastern Riverside County and southwestern Arizona (**Figure 2-5 and Table 2-1)**.

As mentioned above, the PM_{10} exceedance on May 7, 2015, occurred at the Niland station. The Niland station is regarded as one of the "northern" monitoring sites within the Imperial County air monitoring network. In order to properly analyze the contributions from meteorological conditions occurring on May 7, 2015 other meteorological sites were used in this demonstration which include airports within eastern Riverside County, southeastern San Diego County, southwestern Yuma (Arizona) County, Imperial County, and other sites relevant to the wind event, such as within northern Mexico. (**Figure 2-8)**.

FIGURE 2-8
MONITORING SITES IN AND AROUND IMPERIAL COUNTY

Fig 2-8: Depicts a select group of meteorological and PM_{10} monitoring sites in Imperial County, eastern Riverside County, southeastern San Diego County, southwestern Arizona (Yuma County), and northern Mexico. The image provides the location of potential sites used to gather data in support an Exceptional Event Demonstration. Source: Google Earth

In addition to meteorological sites, there are non-regulatory PM_{10} sites located around the Salton Sea that maybe referenced as an aid to help the reader understand the direction and velocity of winds that impact Imperial County. Unless, otherwise specifically indicated concentration references do not imply emissions from the surrounding playa of the Salton Sea. Three sites, in specific, are the Salton City air monitoring station, the Naval Test Base air monitoring station and the Sonny Bono air monitoring station. These stations are privately owned and non-regulatory (**Figures 2-9 to 2-12**). The Salton City station is located 33.27275°N latitude and 115.90062˚W longitude, on the western edge of the Salton Sea (**Figure 2-9**). The station abuts a water reservoir along the Salton Sea with surrounding chaparral vegetation and unpaved open areas and roads. The Naval Test Base station is located 33.16923°N latitude and 115.85593˚W longitude, on the southwestern edge of the Salton Sea (**Figure 2-11**). The station sits on an abandoned US Military site, still owned by the Department of Defense. Unlike the

Salton City station the Naval Test Base station is surrounded by light chaparral vegetation and sandy open dune areas. Directly to the west of the station is an orchard. The Sonny Bono station is located 33.17638°N latitude and 115.62310˚W longitude, on the southern portion of the Salton Sea within the Sonny Bono Salton Sea Wildlife Refuge. The Sonny Bono Salton Sea National Wildlife Refuge is 40 miles north of the Mexican border at the southern end of the Salton Sea within the Sonoran Desert. The Refuge has two separate managed units, 18 miles apart. Each unit contains wetland habitats, farm fields, and tree rows. The land of the Salton Sea Refuge is flat, except for Rock Hill, a small, inactive volcano, located near Refuge Headquarters. The Refuge is bordered by the Salton Sea on the north and farmlands on the east, south, and west.

FIGURE 2-9
SALTON CITY AIR MONITORING STATION

Fig 2-9: Depicts the Salton City air monitoring (circled) site operated by a private entity. Site photos can be seen at the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-10
SALTON CITY AIR MONITORING STATION
WEST

Fig 2-10: Photograph taken by the California Air Resources Board audit team in 2017. The photograph is taken from the west facing the probe. https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-11
NAVAL TEST BASE AIR MONITORING STATION

Fig 2-11: Depicts the Naval Test Base air monitoring (circled) site operated by a private entity. Site photos can be seen at the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13603&date=17

FIGURE 2-12
NAVAL TEST BASE AIR MONITORING STATION
WEST

Fig 2-12: Photograph taken by the California Air Resources Board audit team in 2017. The photograph is taken from the west facing the probe. https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-13
SONNY BONO AIR MONITORING STATION

Fig 2-13: Depicts the Sonny Bono air monitoring (circled) site operated by a private entity. Site photos can be seen at the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-14
SONNY BONO SALTON SEA NATIONAL WILDLIFE REFUGE

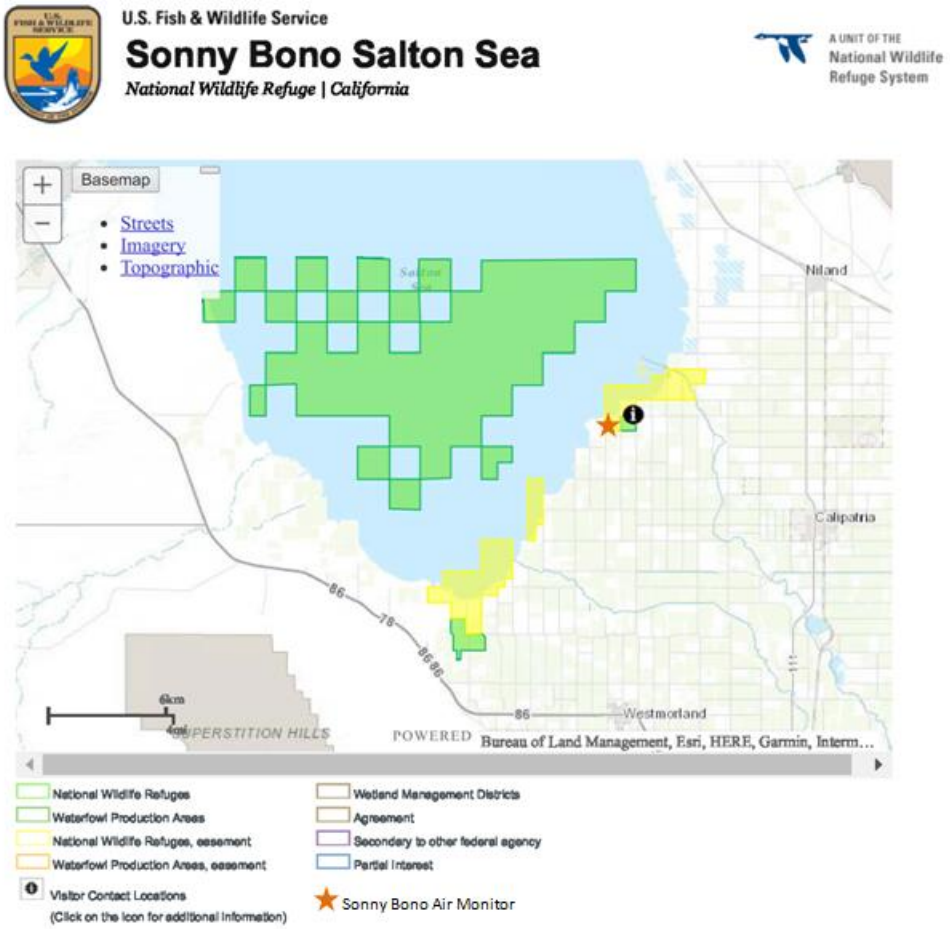


Fig 2-14: The Sonny Bono Wildlife Refuge has about 2,000 acres that are farmed and managed for wetlands. In 1998, the Refuge was renamed after Congressman Sonny Bono, who helped inform the U.S. Congress of the environmental issues facing the Salton Sea as well as acquiring funding for this Refuge to help it respond to avian disease outbreaks and other habitat challenges at the Salton Sea. Source: https://www.fws.gov/refuge/Sonny_Bono_Salton_Sea/about.html

TABLE 2-1
MONITORING SITES IN IMPERIAL COUNTY, RIVERSIDE COUNTY AND ARIZONA
MAY 7, 2015

Monitor Site Name	*Operator	Monitor Type	AQS ID	AQS PARAMETER CODE	ARB Site Number	Elevation (meters)	24-hr PM_{10} ($\mu g/m^3$) Avg	1-hr PM_{10} ($\mu g/m^3$) Max	**Time of Max Reading	Max Wind Speed (mph)	**Time of Max Wind Speed
IMPERIAL COUNTY											
Brawley-Main Street #2	ICAPCD	Hi-Vol Gravimetric	06-025-0007	(81102)	13701	-15	-	-	-	-	-
		BAM 1020					127.8	839	16:00		
Calexico-Ethel Street	CARB	Hi-Vol Gravimetric	06-025-0005	(81102)	13698	3	***134	-	-	18.8	17:00
El Centro-9th Street	ICAPCD	Hi-Vol Gravimetric	06-025-1003	(81102)	13694	9	-	-	-	16.2	15:00
Niland-English Road	ICAPCD	Hi-Vol Gravimetric	06-025-4004	(81102)	13997	-57		-	-	26.6	18:00
		BAM 1020					210.2	734	17:00		
Westmorland	ICAPCD	Hi-Vol Gravimetric	06-025-4003	(81102)	13697	-43		-	-	-	-
RIVERSIDE COUNTY											
Palm Springs Fire Station	SCAQMD	TEOM	06-065-5001	(81102)	33137	174	16	22	16:00	-	-
Indio (Jackson St.)	SCAQMD	TEOM	06-065-2002	(81102)	33157	1	-	-	-	-	-
ARIZONA – YUMA											
Yuma Supersite	ADEQ	TEOM	04-027-8011	(81102)	N/A	60	106.9	460	20:00	-	-

*CARB = California Air Resources Board
*ICAPCD = Air Pollution Control District, Imperial County
*SCAQMD = South Coast Air Management Quality District
*ADEQ =Arizona Department of Environmental Quality

**Time represents the actual time/hour of the measurement in question according to the zone time (PST unless otherwise noted)
****Not a scheduled run day for Hi-Vol measurements-Makeup*

II.2 Climate

As mentioned above, Imperial County is part of the Colorado Desert, which is a subdivision of the larger Sonoran Desert (**Figure 2-15**) encompassing approximately 7 million acres (28,000 km^2). The desert area encompasses Imperial County and includes parts of San Diego County, Riverside County, and a small part of San Bernardino County.

FIGURE 2-15
SONORAN DESERT REGION

Fig 2-15: Depicts the magnitude of the region known as the Sonoran Desert. Source: Arizona-Sonora Desert Museum at http://desertmuseum.org/center/map.php

The majority of the Colorado Desert lies at a relatively low elevation, below 1,000 feet (300 m), with the lowest point of the desert floor at 275 feet (84 m) below sea level at the Salton Sea. Although the highest peaks of the Peninsular Range reach elevations of nearly 10,000 feet (3,000 m), most of the region's mountains do not exceed 3,000 feet (910 m).

In the Colorado Desert (Imperial County), the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect to the northern-most extensions of the East Pacific Rise. Consequently, the region is subject to earthquakes, and the crust is being stretched, resulting in a sinking of the terrain over time.

The Colorado Desert's climate distinguishes it from other deserts. The region experiences

greater summer daytime temperatures than higher-elevation deserts and almost never experiences frost. In addition, the Colorado Desert experiences two rainy seasons per year (in the winter and late summer), especially toward the southern portion of the region which includes a portion of San Diego County. The Colorado Desert portion of San Diego County receives the least amount of precipitation. Borrego Springs, the largest population center within the San Diego desert region averages 5 inches of rain with a high evaporation rate. By contrast, the more northerly Mojave Desert usually has only winter rains.

The west coast Peninsular Ranges, or other west ranges, of Southern California–northern Baja California, block most eastern Pacific coastal air and rains, producing an arid climate. Other short or longer-term weather events can move in from the Gulf of California to the south, and are often active in the summer monsoons. These include remnants of Pacific hurricanes, storms from the southern tropical jet stream, and the northern Inter Tropical Convergence Zone (ITCZ).

The arid nature of the region is demonstrated when historic annual average precipitation levels in Imperial County average 3.11" (**Figure 2-16)**. During the 12 month period prior to the May 7, 2015 event, Imperial County measured a total annual precipitation of 3.22 inches. The slight increase in precipitation of .011 inches was insufficient to relieve the existing arid conditions that result in soils that are particularly susceptible to particulate suspension by the elevated gusty winds.

FIGURE 2-16
IMPERIAL COUNTY HISTORICAL WEATHER

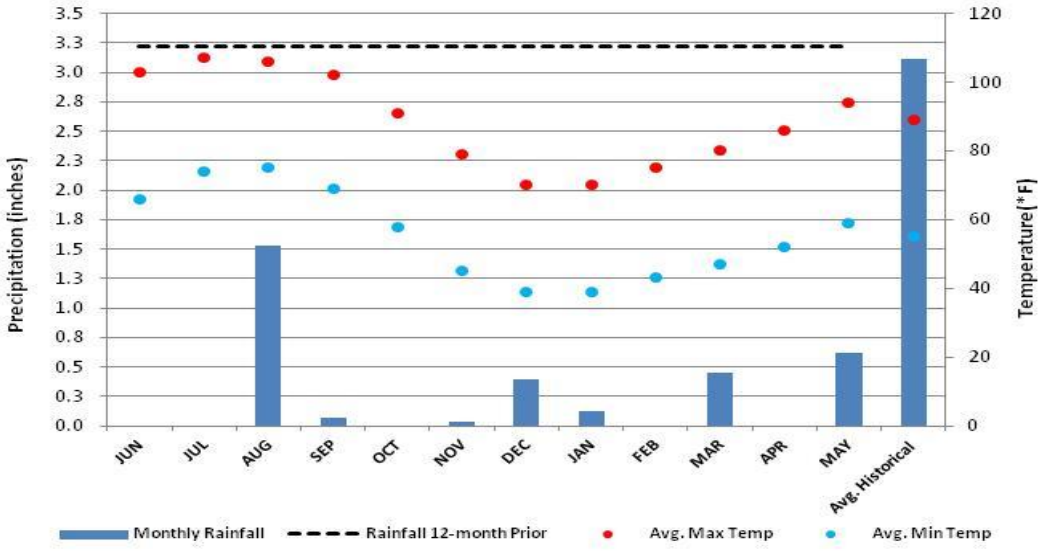


Fig 2-16: The total annual precipitation prior to May 7, 2015 event measured 3.22 inches, which was slightly above the average annual precipitation of 3.11 inches, was insufficient to relieve the arid conditions existing in Imperial County. Meteorological data courtesy of Weather Underground, California Observed Climate Normals, and Western Regional Climate Center (WRCC) http://www.wrcc.dri.edu/cgi-bin/climain.pl?ca2713

The NWS explains that the speed of any wind resulting from a weather system is directly proportional to the change in air pressure, called a pressure gradient, such that when the pressure gradient increases so does the speed of the wind.[4] Because the pressure gradient is simply the difference in pressure between the high and low pressure areas, changes in weather patterns may recur seasonally.

Typically high pressure brings clear skies and with no clouds there is more incoming shortwave solar radiation causing temperatures to rise. When surface winds become light, the cooling of the air produced directly under a high pressure system can lead to a buildup of particulates in urban areas under an elongated region of relatively high atmospheric pressure or ridge causing widespread haze. Conversely, a trough is an elongated region of relatively low atmospheric pressure often associated with fronts. Troughs may be at the surface, or aloft under various conditions. Most troughs bring clouds, showers, and a wind shift, particularly following the passage of the trough.

While windblown dust events in Imperial County during the summer monsoon season are often due to outflow winds from thunderstorms, windblown dust events in the fall, winter, and spring are usually due to strong winds associated with low-pressure systems and cold fronts moving southeast across California. These winds are the result of strong surface pressure gradients between the approaching low-pressure system, accompanying cold front, and higher pressure ahead of it. As the low-pressure system and cold front approaches and passes, gusty southwesterly winds typically shift to northwesterly causing variable west winds. The strong winds can loft dust into the air and transport it over long distances, especially if soils in the region are dry.

II.3 Event Day Summary

The exceptional event for May 7, 2015, was caused by continued strong westerly winds that preceded a Pacific weather disturbance (storm) moving inland over the southwest that was enhanced by the presence of a strong upper level trough. As early as May 6, 2015, strong westerly winds entrained fugitive dust from the mountains and passes within San Diego County into Imperial County impacting air quality and causing an exceedance at the Niland monitor. **Figures 2-17 through 2-10** illustrate how regional the weather system was, affecting parts of California and Arizona.

[4] NWS JetStream – Origin of Wind http://www.srh.noaa.gov/jetstream/synoptic/wind.html

FIGURE 2-17
COMBINED SATELLITE SURFACE MAP AND 500MB HEIGHT MAP
MAY 7, 2015

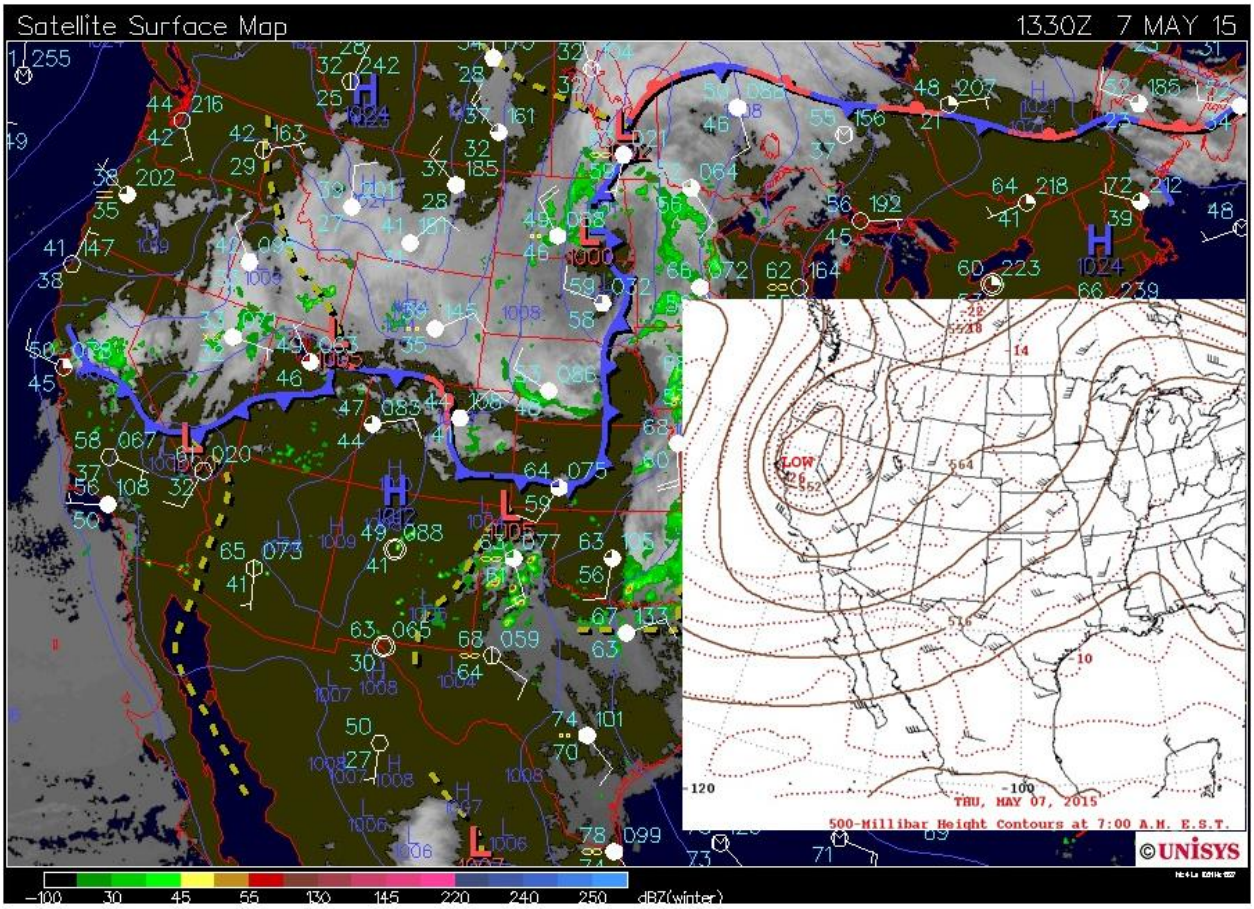


Fig 2-17: The satellite surface composite map for May 7, 2015, captured at 1330Z or 5:30am (6:30 PDT) indicates low pressure centered near the California-Nevada-Arizona borders and a low pressure trough (yellow dotted line) sitting just to the east of California. The inset image shows the upper level low at 4:00am (5:00 PDT) that drove and enhanced the surface system that brought gusty winds to the region. Source: Image courtesy of Unisys and the University Corporation for Atmospheric Research. Prepared by the National Centers for Environmental Prediction, Weather Prediction Center; http://www.wpc.ncep.noaa.gov/dailywxmap/index_20150507.html

FIGURE 2-18
SURFACE ANALYSIS MAPS – MAY 7, 2015

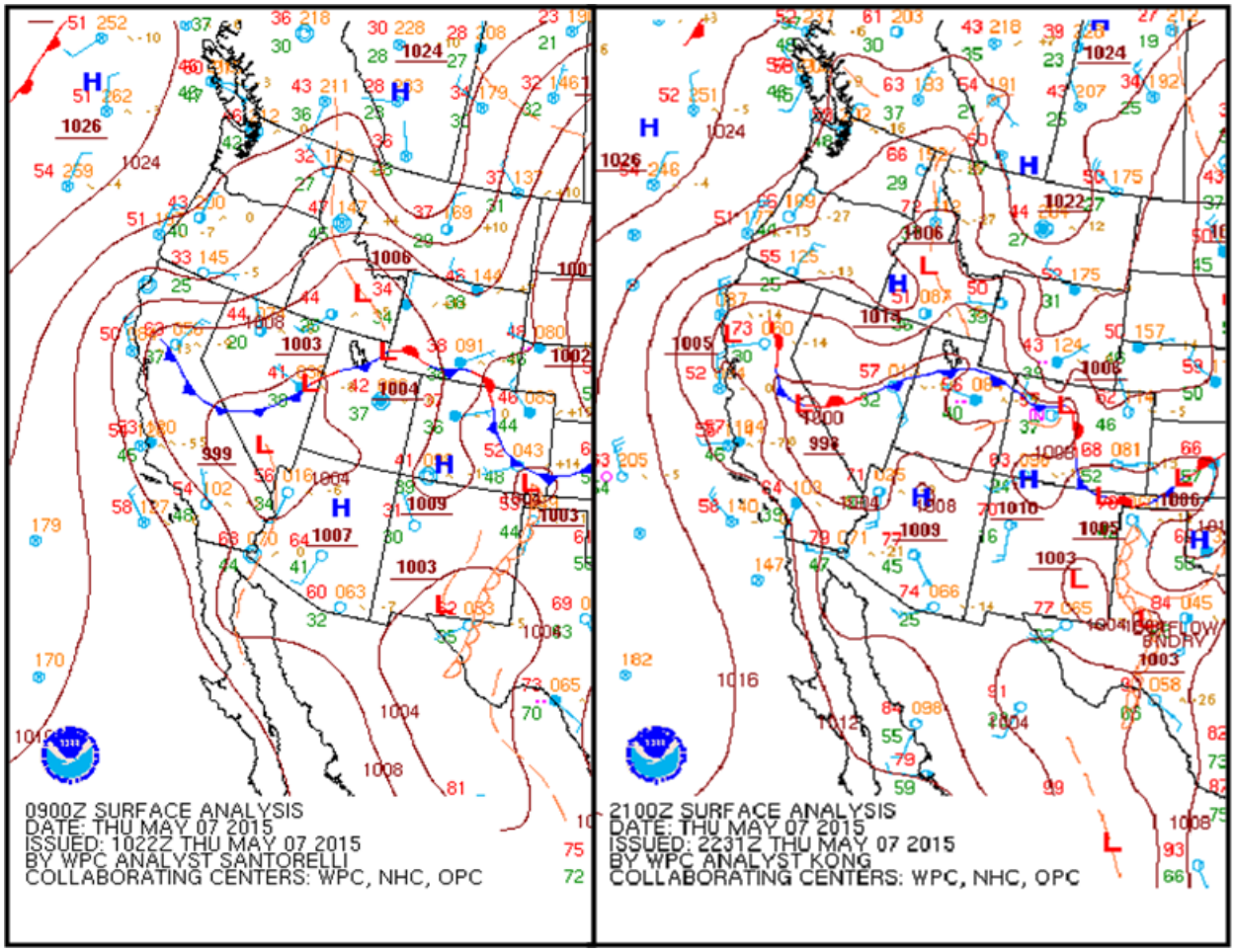


Fig 2-18: Surface analysis maps captured at 1:00am and 1:00pm (2:00 PDT and 14:00 PDT respectively) on May 7, 2015, show a low pressure over southern Nevada and parts of California, Arizona, and Utah. Image courtesy of the WPC Surface Analysis Archive

FIGURE 2-19
GOES-W VISIBLE-INFRARED IMAGES – MAY 7, 2015

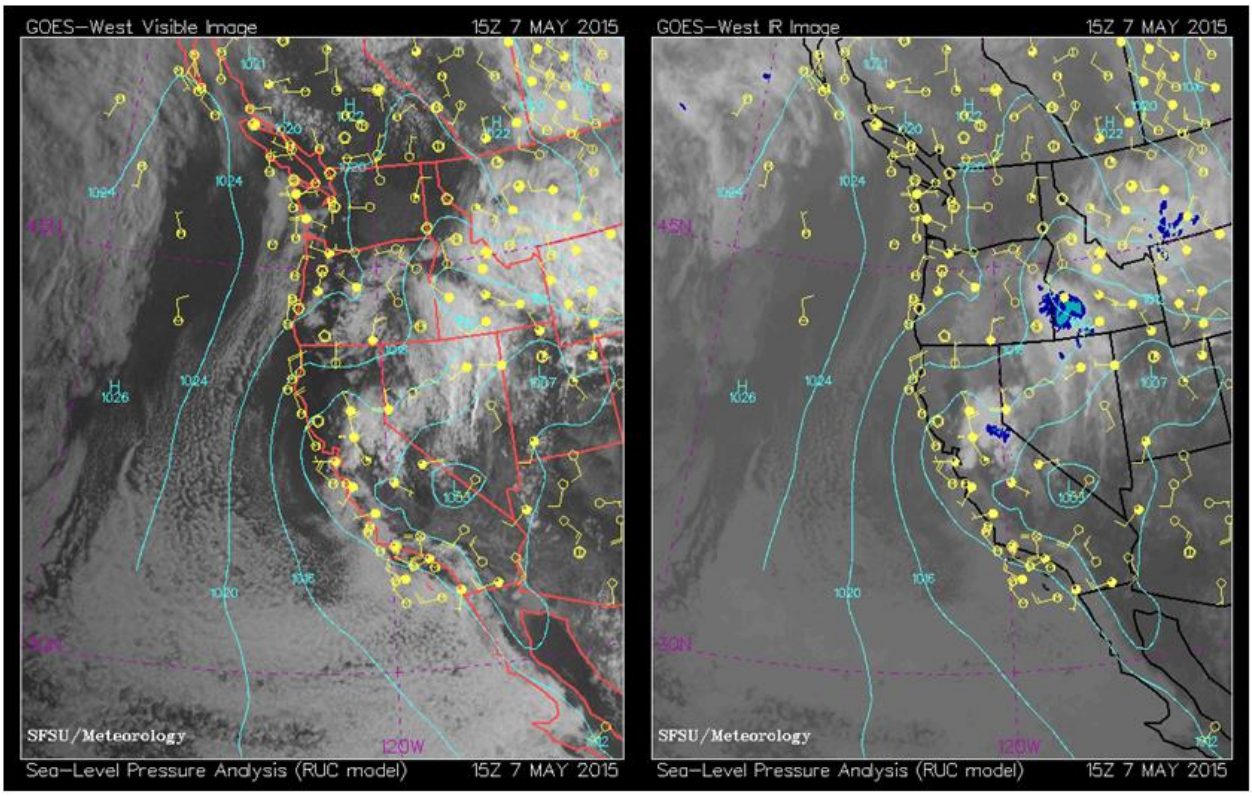


Fig 2-19: A set of GOES-W visible (left) and infrared (right) images captured May 7, 2015, at 7:00am (8:00 PDT). Wind barbs indicate WSW winds of ~15-20 mph over southeastern California. Images courtesy of SFSU Department of Earth and Climate Sciences and the California Regional Weather Server

The intensity of the unsettled weather prompted the National Weather Service (NWS) San Diego and Phoenix office to issue Urgent Weather Messages. The San Diego office issued an Urgent Weather Message as early as May 5, 2015 at 12:42pm (1:42pm PDT) which included a wind advisory for the San Diego deserts effective from 3:00pm (4:00pm PDT) May 6, 2015 to 2:00am (3:00am PDT) May 8, 2015. The San Diego office updated its area forecast for the San Diego mountains at 1:00pm (2:00pm PDT) on May 5, 2015 which identified a the chance for overnight measurable rain, showers and potential thunderstorms for May 6, 2015 and May 7, 2015. By the evening of May 6, 2015 and into the early morning hours of May 7, 2015 the San Diego NWS office updated its area forecast discussions to include variable precipitation totals for the mountains with the deserts experiencing a trace amount. In addition, snow was forecast as low as 5,500 feet. Fox5 was the first news station to report on the potential of rain and snow indicating the heaviest rain at the higher elevations with the lower elevations, campo, having slightly less rain. By 1:00pm (2:00pm PDT) on May 7, 2015 the San Diego office area forecast identified a couple of waves that would affect evening chances for widespread showers and thunderstorms along with snow fall in the mountains. The second wave would introduce greater precipitation by midday Friday, May 8, 2015. Entravision San Diego published

on May 7, 2015 at 12:53pm (1:53 PDT) a report on the arrival of a storm that would bring rain throughout the day on May 7, 2015 with the heaviest rainfall expected during the evening hours in Miramar and Campo. NBC 7 San Diego and KUSI news reported on the effects of the storm as chilly, wet, with local rain fall totals in the mountains and windy conditions for the mountain passes and canyons on May 8, 2015 confirming the effects of the Pacific storm as it moved through the San Diego mountains and deserts and into Imperial County. The level of moisture and the lack thereof within the San Diego mountains and passes will be one of the significant factors in the amount of entrained emissions from outside the borders of Imperial County that would increase local emissions significantly enough to cause an exceedance on May 7, 2015 and not on May 8, 2015. (see **Appendix A**)

Unlike the San Diego office the Phoenix office updated its area forecast for May 6, 2015, at 2:15pm (3:15 PDT/MST) primarily for Arizona with little but snippets for southeast California. The forecast did confirm the tightening of the surface gradient confirming the creation of stronger gusty winds by May 7, 2015 in the afternoon and evening. By May 7, 2015 at 2:06am (3:06 PDT/MST) the NWS Phoenix office issued an Urgent Weather message that included a wind advisory, effective 2:00pm (3:00pm PDT/MST) to 9:00pm (10:00pm PDT/MST). The advisory identified potentially hazardous crosswinds and locally reduced visibility due to blowing dust and sand with west southwest winds 25 to 35 mph and gusts 40 to 45 mph. The gusty west winds were confirmed by the NWS Phoenix office's updated forecast at 2:30am (3:30 PDT/MST) which also included a slight chance of showers over the western portions of Joshua Tree. It isn't until the 11:36pm (12:36 PDT/MST) NWS Phoenix update that mention is made of a Pacific Weather System. The update did confirm that Arizona was experiencing a wind component that was southerly while southeast California was experience a more westerly direction. As the Pacific weather (storm) disturbance moved into Imperial County, strong winds did in fact occur.

Figure 2-20 illustrates the surrounding sites to the west to southwest of Niland which measured wind speeds at or above 25 mph and gusts at or above 22 mph. The Ocotillo Wells (MesoWest Station ID: KD6RSQ-5) and the Fish Creek Mountain (MesoWest Station ID: FHCC1) stations along with local airports, Imperial County (KIPL) and El Centro NAF (KNJK) measured winds in excess of the 25 mph threshold, in some cases for several hours continuously or gusts above 30 mph. Several stations in Riverside County, including the Blythe Airport (KBLH), Palm Springs International Airport (KPSP) and Jacqueline Cochran Regional Airport (KTRM) measured wind gusts between 29 and 34 mph.

A summary of maximum winds, peak wind gusts, and wind direction at monitors in Imperial County, eastern Riverside County, Yuma County, Arizona, and Mexicali, Mexico, is shown in **Table 2-2**. For detailed meteorological station graphs see **Appendix B**.

FIGURE 2-20
NILAND RAMP-UP ANALYSIS – MAY 7, 2015

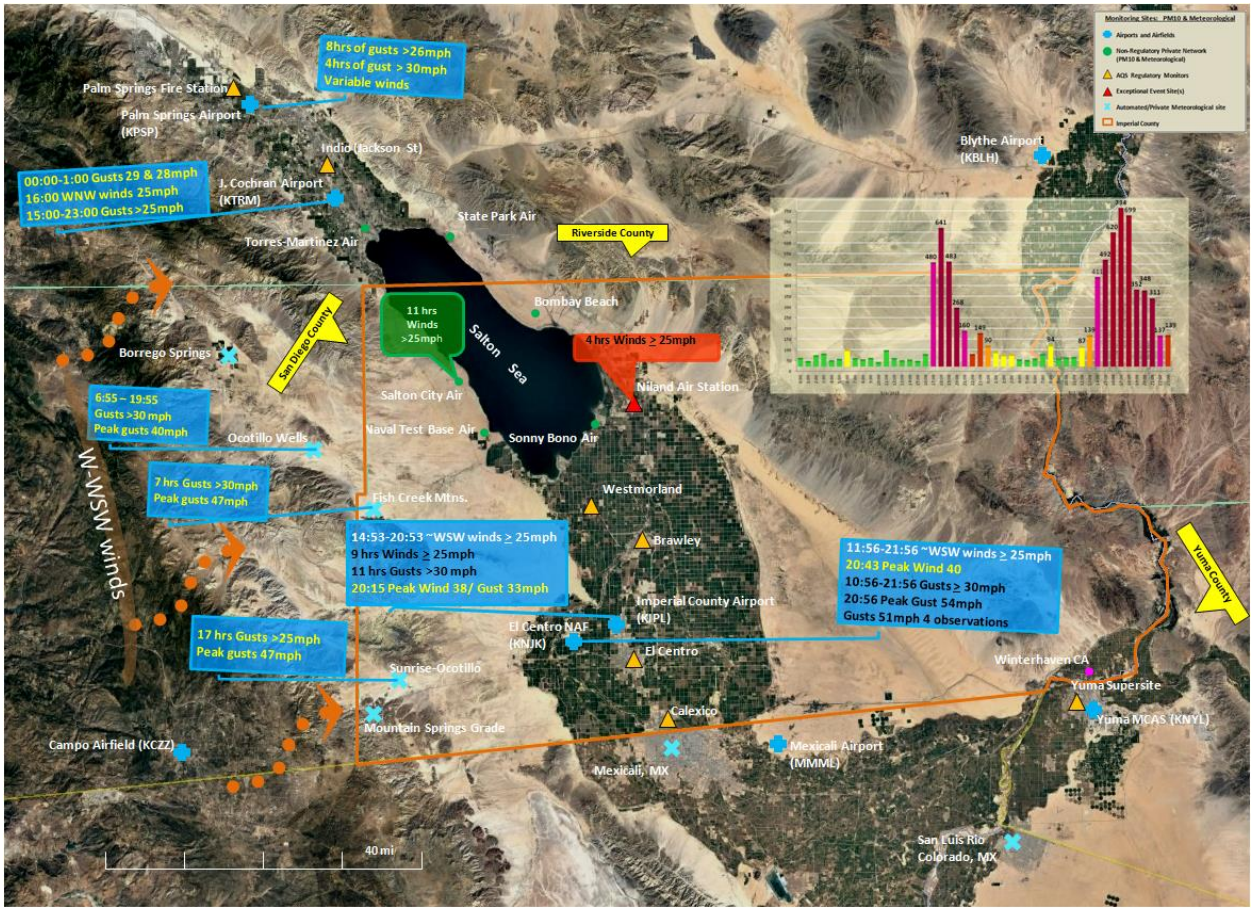


Fig 2-20: The graphic depicts the measured wind speeds and gusts at various surrounding sites. Winds within the mountains of San Diego County began increasing as early as May 6, 2015 and on through May 8, 2015. However, the strongest and most consistent winds occurred on May 7, 2015. Moisture levels within the San Diego mountains during the late evening of May 6, 2015 and early morning hours of May 7, 2015 were not sufficient to control the entrained fugitive dust that impacted the Niland monitor on May 7, 2015. Dust was lofted on the western edge of the Sonoran Desert near the San Diego-Imperial County border and transported into Imperial County affecting air quality. Reduced visibility caused by blowing dust was reported at local airfields (see **Fig. 5-9**). Wind data from the NCEI's QCLCD system, the University of Utah's MesoWest. Niland Air quality data and wind data from the EPA's AQS data bank

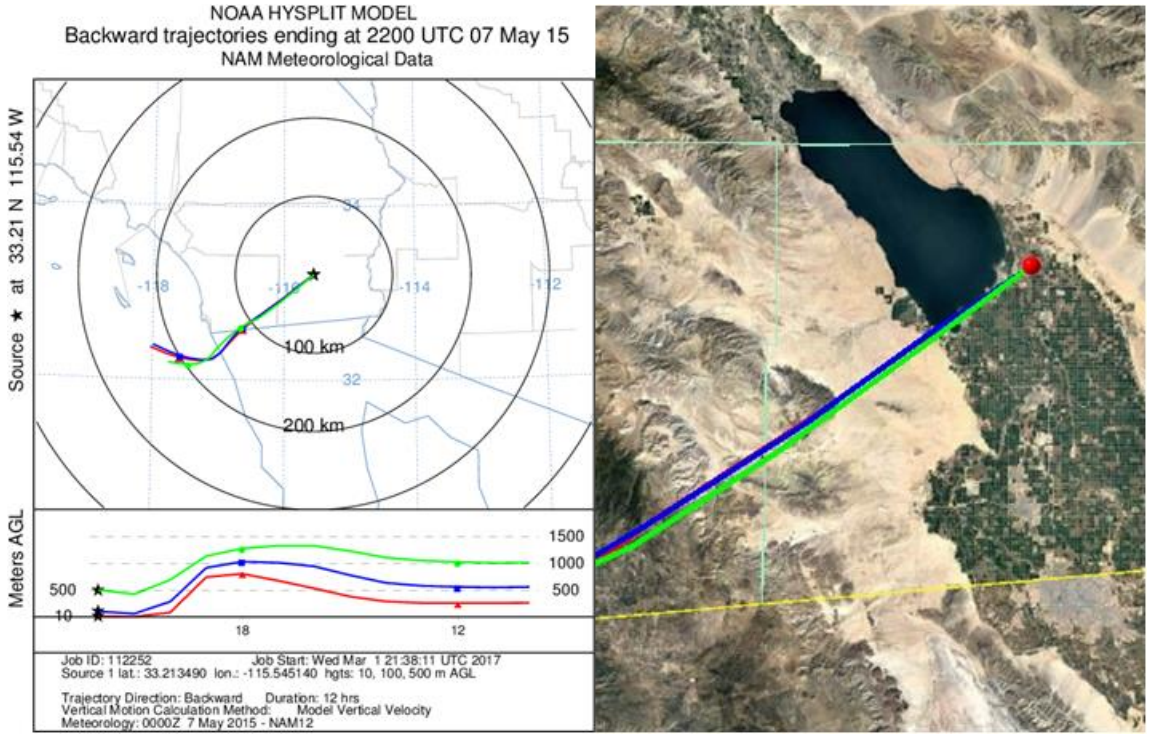
TABLE 2-2
WIND SPEEDS ON MAY 7, 2015

Station Monitor Airport Meteorological Data	Maximum Wind Speed (WS) (mph)	Wind Direction during Max WS (degrees)	Time of Max Wind Speed	24 hr Maximum Wind Gust (WG) (mph)	Time of Max WG	PM_{10} correlated to time of Max Wind Speed	
						Nil	Brw
IMPERIAL COUNTY							
Imperial Airport (KIPL)	33	260	20:15	31	20:15	348	363
Naval Air Facility (KNJK)	44	250	20:43	54	20:56	348	363
Calexico (Ethel St)	18.8	278	17:00	-	-	386	-
El Centro (9th Street)	16.2	280	15:00	-	-	492	193
Niland (English Rd)	26.6	262	18:00	-	-	699	-
RIVERSIDE COUNTY							
Blythe Airport (KBLH)	23	240	16:52	30	12:52	620	839
Palm Springs Airport (KPSP)	21	340	10:53	34	17:53	35	29
Jacqueline Cochran Regional Airport (KTRM) - Thermal	21	280	20:52	29	21:52	348	363
ARIZONA - YUMA							
Yuma MCAS (KNYL)	21	300	17:57	31	19:57	386	-
MEXICALI - MEXICO							
Mexicali Int. Airport (MXL)	28.8	270	20:00	-	-	348	363

The back trajectory National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory HYSPLIT model,[5] **Figure 2-21** demonstrate the path of air flow in the hours leading up to the event. The path of the air took winds over the San Diego mountains and deserts slopes, within the western section of Imperial County, across largely barren soils and over agricultural farmland impacting the Niland monitor. Dust particles were entrained and transported by these strong winds, impacting PM_{10} monitors throughout southeastern California and Arizona. A more detailed analysis of the HYSPLIT is found in **Section V**.

[5] 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.

FIGURES 2-21
HYSPLIT BACK TRAJECTORY MODELS



Figs 2-21: A 12-hour back trajectory ending at Niland at 2:00pm (3:00 PDT) approximately one hour after the Niland monitor measured elevated PM_{10} concentrations above 100µg/m^3. The Niland monitor measured a PM_{10} concentration of 139µg/m^3 at 1:00pm (2:00 PDT) with a peak PM_{10} concentration at 5:00pm (6:00 PDT) of 734 µg/m^3. The right image is the same trajectory using a base map. Red line indicates air flow at 10 meters AGL (above ground level); blue=100m; green=500m. Dynamically generated through NOAA's Air Resources Laboratory

Figure 2-22 illustrates the elevated levels of PM_{10} concentrations measured in Riverside, Imperial, and Yuma counties for the day before and the day of and after May 7, 2015. Elevated emissions were entrained into Imperial County impacting the Niland monitor when strong west southwest winds that were associated with the passage of a Pacific weather disturbance (storm) moving inland over the southwest that was enhanced by the presence of a strong upper level trough through Imperial County on May 6, 2015 and continued through May 7, 2015.

FIGURE 2-22
72 HOUR PM_{10} CONCENTRATIONS NEIGHBORING SITES

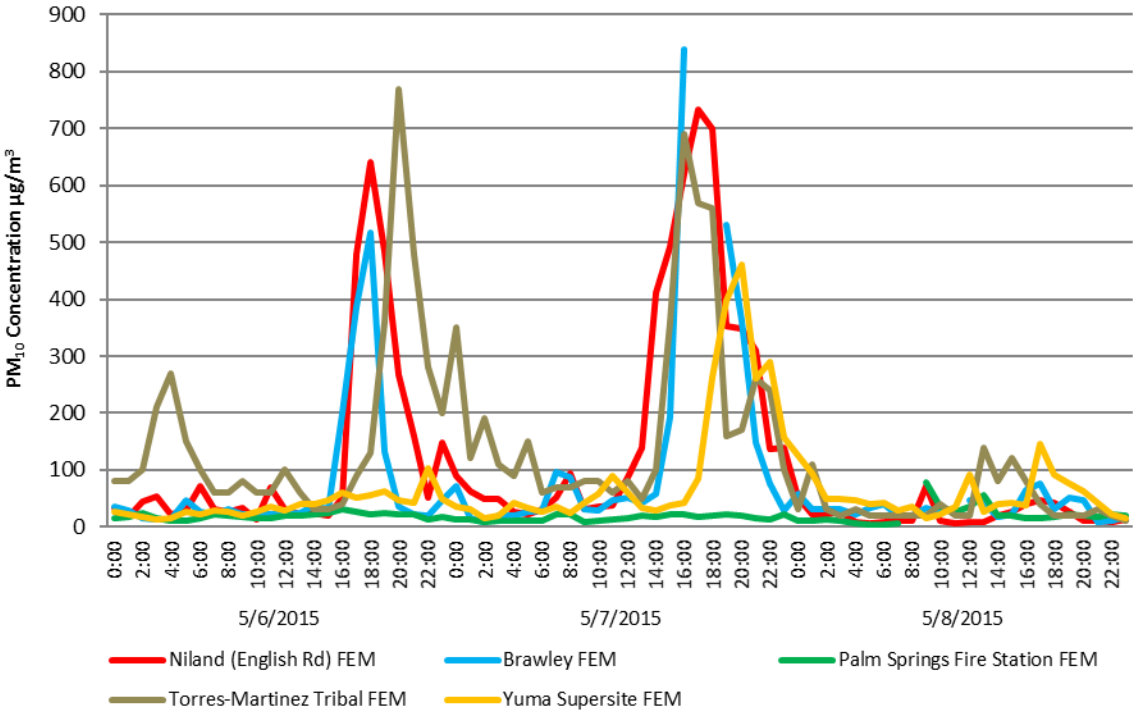


Fig 2-22: Is the graphical representation of the 72-hour PM_{10} concentrations at various monitoring locations throughout Riverside, Imperial, and Yuma counties. All sites except Palm Springs Fire Station saw significantly increased hourly concentrations during the latter part of May 7. Air quality data is from the EPA's AQS data bank

III Historical Concentrations

III.1 Analysis

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. The following time series plots illustrate that PM_{10} concentrations measured at the Niland monitor on May 7, 2015, were compared to non-event and event days demonstrating the variability over several years and seasons. The analysis, also, provides supporting evidence that there exists a clear causal relationship between the May 7, 2015 high wind event and the exceedance measured at the Niland monitor.

Figures 3-1 and 3-2 show the time series of available FRM and BAM 24-hr PM_{10} concentrations at the Niland monitor for the five year six month period of January 1, 2010 to May 7, 2015, for a total of 1,945 sample run days. Note that prior to 2013, the BAM data was not considered FEM and was not reported into AQS.[6] In order to properly establish the variability of the event, as it occurred on May 7, 2015, 24 hour averaged PM_{10} concentrations were compiled and plotted as a time series, January 1, 2010 to May 7, 2015 to provide a historical perspective of PM_{10} concentrations at the Niland monitor. Both figures illustrate that the exceedance which occurred on May 7, 2015 was outside the normal historical concentrations when compared to event and non-event days.

[6] 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/m3) at local temperature and pressure (LTP) as opposed to standard temperature and pressure (STP, 760 torr and 25 C). 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.

FIGURE 3-1
NILAND HISTORICAL
FRM AND FEM PM_{10} AVG CONCENTRATIONS
JANUARY 1, 2010 TO MAY 7, 2015

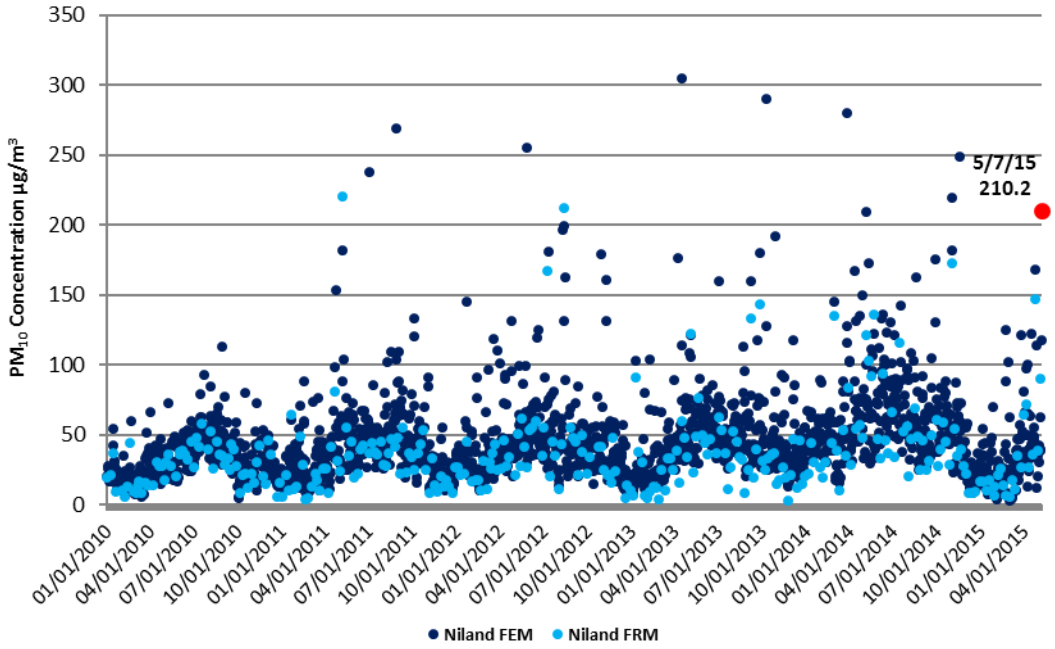


Fig 3-1: A historical comparison of PM_{10} concentrations to concentrations at the Niland monitor demonstrates that the measured concentration of 210.2µg/m^3 on May 7, 2015 was outside the normal historical concentrations when compared to similar days and non-event days

The time series, **Figure 3-1**, for Niland includes 2,258 credible samples, measured either FRM or FEM monitors between January 1, 2010 and May 7, 2015. Overall, the time series illustrates that of the 2,258 credible samples measured during the 1,945 sampling days there were a total of 30 exceedance days which is less than a 2% occurrence rate. Of the 30 measured exceedance days only ten days were measured during the second quarter (April thru June) which equates to less than a 3% rate of occurrence. The May 7, 2015 exceedance day is less than 5% of the total non-event days for second quarter. Overall, the May 7, 2015 concentration is outside the normal historical measurements for the second quarter. The other 19 exceedances occurred during the first, third, and fourth quarters. No exceedances of the standard occurred during 2010. As mentioned above FEM BAM data was not considered regulatory from 2010 to 2012.

FIGURE 3-2
NILAND SEASONAL COMPARISON
PM_{10} 24 HR AVG CONCENTRATIONS
APRIL 1, 2010 THRU JUNE 30, 2015

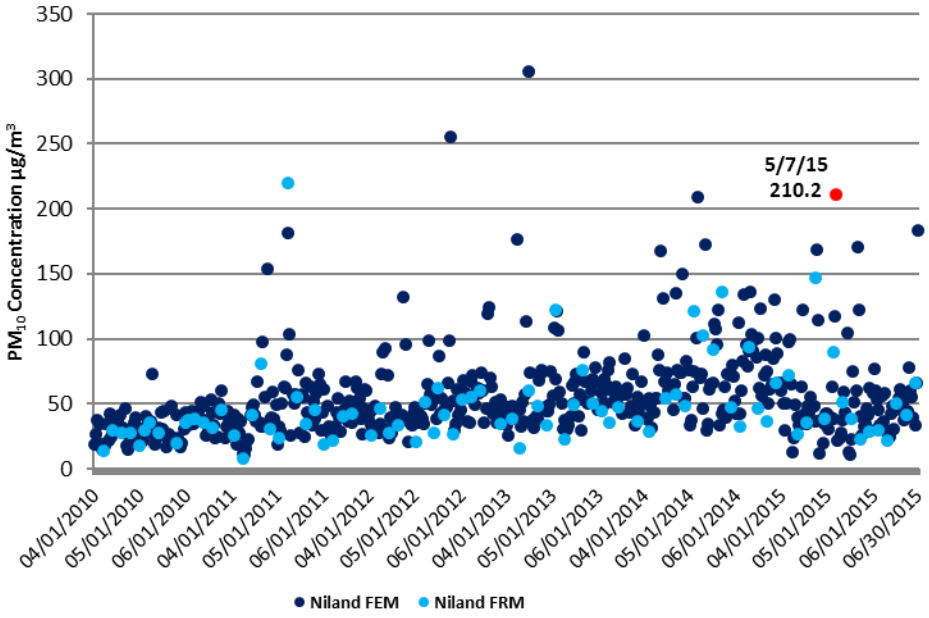


Fig 3-2: The seasonal historical comparison using the months of April through June for the years 2010 thru 2015 supports that the measured exceedance at the Niland monitor on May 7, 2015 was outside the historical norm

Figure 3-2 for Niland illustrates the seasonal pattern between April and June for the years 2010 through 2015. Of the 631 credible samples measured only 10 sampled exceedances occurred between 2010 and 2015, April to June. This equates to less than a 4% exceedance rate. The May 7, 2015 measured concentration at the Niland monitor was outside the normal historical and seasonal concentrations when compared to both event days and non-event days.

FIGURE 3-3
NILAND HISTORICAL
PM_{10} 24 HR FRM & FEM CONCENTRATIONS
JANUARY 1, 2010 TO MAY 7, 2015

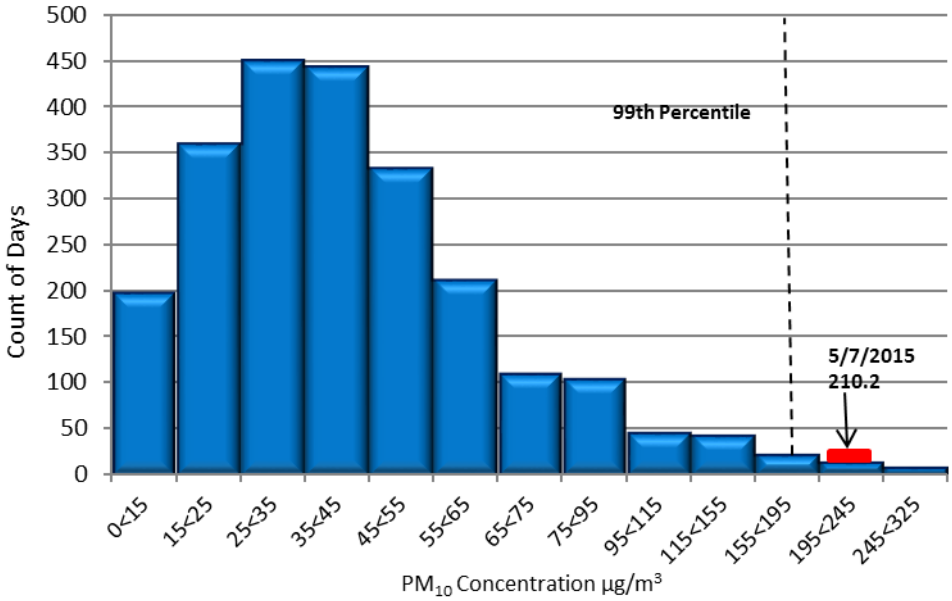


Fig 3-3: The 24-hr average PM_{10} concentrations measured at Niland monitoring site demonstrates that the May 7, 2015 event was in excess of the 99th percentile

FIGURE 3-4
NILAND SEASONAL
PM_{10} 24 HR FRM & FEM CONCENTRATIONS
APRIL 1, 2010 THRU JUNE 30, 2015

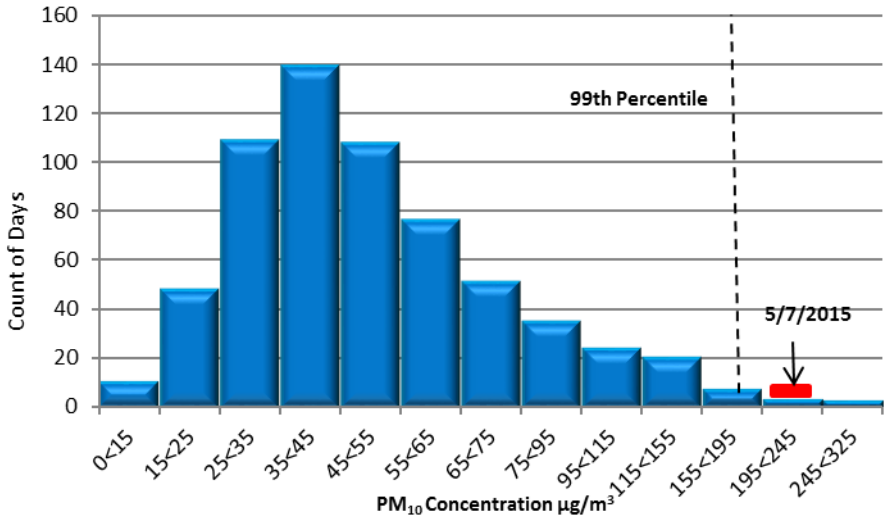


Fig 3-4: The 24-hr average PM_{10} concentration at the Niland monitoring site demonstrates that the May 7, 2015 event was in excess of the 99th percentile

For the combined FRM and FEM data set for the Niland monitor, the annual historical and the seasonal historical PM_{10} concentrations of 210.2µg/m^3 is above the 99th percentile ranking. Looking at the annual time series concentrations, the seasonal time series concentrations, and the percentile rankings for both the historical and seasonal patterns the May 7, 2015 measured exceedance of 210.2µg/m^3 for the Niland monitor is clearly outside the normal concentration levels when comparing to non-event days and event days.

III.2 Summary

The information provided, above, by the time series plot, seasonal time series plot and the percentile ranking illustrate that the PM_{10} concentration observed on May 7, 2015 occurs infrequently. When comparing the measured PM_{10} levels on May 7, 2015 and following USEPA EER guidance, this demonstration provides supporting evidence that the measured exceedance measured at the Niland monitoring site was outside the normal historical and seasonal concentration levels.

The historical concentration analysis provided here supports the determination that the May 7, 2015 natural event impacted the concentrations levels at the Niland monitor causing an exceedance. The concentration analysis further supports that the natural event affected air quality in such a way that there exists a clear causal relationship between the measured exceedance on May 7, 2015 and the natural event, qualifying the natural event as an Exceptional Event

IV Not Reasonably Controllable or Preventable

According to the October 3, 2016 promulgated revision to the Exceptional Event (EE) rule under 40 CFR §50.14(b)(8) air agencies must address the "not reasonably controllable or preventable" (nRCP) criterion as two prongs. In order to properly address the nRCP criterion the ICAPCD must not only identify the natural and anthropogenic sources of emissions causing and contributing to the monitored exceedance but must identify the relevant State Implementation Plan (SIP) measures and/or other enforceable control measures in place for the identified sources. An effective analysis of the nRCP must include the implementation status of the control measures in order to properly consider the measures as enforceable. USEPA considers control measures to be enforceable if approved into the SIP within 5 years of an EE demonstration submittal. The identified control measures must address those specific sources that are identified as causing or contributing to a monitored exceedance.

The final EE rule revision explains that an event is considered not reasonably controllable if reasonable measures to control the impact of the event on air quality were applied at the time of the event. Similarly, an event is considered not reasonably preventable if reasonable measures to prevent the event were applied at the time of the event. However, for "high wind events" when PM_{10} concentrations are due to dust raised by high winds from desert areas whose sources are controlled with Best Available Control Measures (BACM) then the event is a "natural event" where human activity plays little or no direct causal role and thus is considered not preventable.

This section begins by providing background information on all SIP and other enforceable control measures in force during the EE for May 7, 2015. In addition, this May 7, 2015 demonstration provides technical and non-technical evidence that strong and gusty west southwest winds blew across the mountains and deserts within southeastern California and into Imperial County suspending particulate matter impacting the Niland monitor on May 7, 2015. This section identifies all natural and anthropogenic sources and provides regulatory evidence of the enforceability of the control measures in place during the May 7, 2015 EE.

IV.1 Background

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,

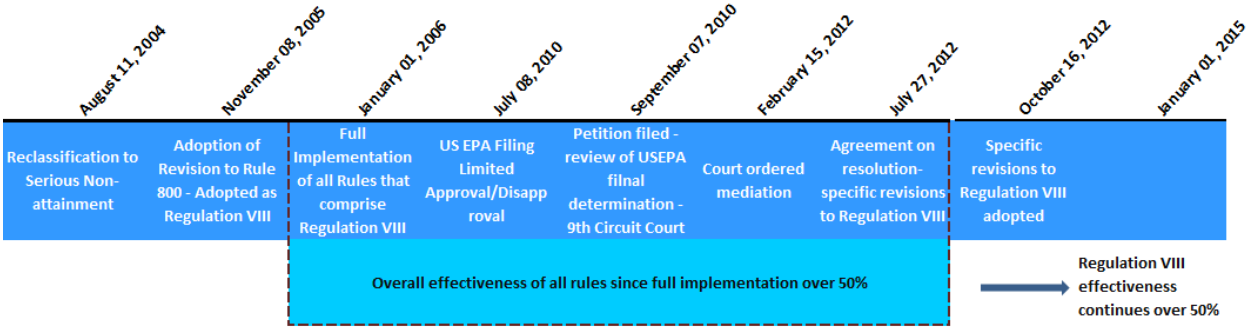
1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.

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. These revisions are reflected in the version of Regulation VIII adopted by ICAPCD on October 16, 2012 and approved by USEPA April 22, 2013. Since 2006 ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County

FIGURE 4-1



REGULATION VIII GRAPHIC TIMELINE DEVELOPMENT

Fig. 4-1: Regulation VIII Graphic Timeline

IV.1.a Control Measures

A brief summary of Regulation VIII which is comprised of seven fugitive dust rules is found below. The complete set of rules can be found in **Appendix D**.

ICAPCD's Regulation VIII consists of seven interrelated rules designed to limit emissions of PM_{10} from anthropogenic fugitive dust sources in Imperial County.

Rule 800, General Requirements for Control of Fine Particulate Matter, provides definitions, a compliance schedule, exemptions and other requirements generally applicable to all seven rules. It requires the United States Bureau of Land Management (BLM), United States Border Patrol (BP) and DPR to submit dust control plans (DCP) to mitigate fugitive dust from areas and/or activities under their control. Appendices A and B of Rule 800 describe methods for determining compliance with opacity and surface stabilization requirements in Rules 801 through 806.

Rule 801, Construction and Earthmoving Activities, establishes a 20% opacity limit and control requirements for construction and earthmoving activities. Affected sources must submit a DCP and comply with other portions of Regulation VIII regarding bulk materials, carry-out and track-out, and paved and unpaved roads. The rule exempts single family homes and waives the 20% opacity limit in winds over 25 mph under certain conditions.

Rule 802, Bulk Materials, establishes a 20% opacity limit and other requirements to control dust from bulk material handling, storage, transport and hauling.

Rule 803, Carry-Out and Track-Out, establishes requirements to prevent and clean-up mud and dirt transported onto paved roads from unpaved roads and areas.

Rule 804, Open Areas, establishes a 20% opacity limit and requires land owners to prevent vehicular trespass and stabilize disturbed soil on open areas larger than 0.5 acres in urban areas, and larger than three acres in rural areas. Agricultural operations are exempted.

Rule 805, Paved and Unpaved Roads, establishes a 20% opacity limit and control requirements for unpaved haul and access roads, canal roads and traffic areas that meet certain size or traffic thresholds. It also prohibits construction of new unpaved roads in certain circumstances. Single-family residences and agricultural operations are exempted.

Rule 806, Conservation Management Practices, requires agricultural operation sites greater than 40 acres to implement at least one conservation management practice (CMP) for each of several activities that often generates dust at agricultural operations. In addition, agricultural operation sites must prepare a CMP plan describing how they comply with Rule 806, and must make the CMP plan available to the ICAPCD upon request.

IV.1.b Additional Measures

Imperial County Natural Events Action Plan (NEAP)

On August 2005, the ICAPCD adopted a NEAP for the Imperial County, as was required under the former USEPA Natural Events Policy, to address PM_{10} events by:

- Protecting public health;
- Educating the public about high wind events;
- Mitigating health impacts on the community during future events; and
- Identifying and implementing BACM measures for anthropogenic sources of windblown dust.

Smoke Management Plan (SMP) Summary

There are 35 Air Pollution Control Districts or Air Quality Management Districts in California which are required to implement a district-wide smoke management program. The regulatory basis for California's Smoke Management Program, codified under Title 17 of the California Code of Regulations is the "Smoke Management Guidelines for Agricultural and Prescribed Burning" (Guidelines). California's 1987 Guidelines were revised to improve interagency coordination, avoid smoke episodes, and provide continued public safety while providing adequate opportunity for necessary open burning. The revisions to the 1987 Guidelines were approved March 14, 2001. All air districts, with the exception of the San Joaquin Valley Air Pollution Control District (SJAPCD) were required to update their existing rules and Smoke Management Plans to conform to the most recent update to the Guidelines.

Section 80150 of Title 17 specifies the special requirements for open burning in agricultural operations, the growing of crops and the raising of fowl or animals. This section specifically requires the ICAPCD to have rules and regulations that require permits that contain requirements that minimize smoke impacts from agricultural burning.

On a daily basis, the ICAPCD reviews hourly surface meteorological reports from various airport agencies, the NWS, State fire agencies and CARB to help determine whether the day is a burn day. Using a four quadrant map of Imperial County allowed burns are allocated in such a manner as to assure minimal to no smoke impacts safeguarding the public health. Finally, all permit holders are required to notice and advise members of the public of a potential burn. This noticing requirement is known as the Good Neighbor Policy. On May 7, 2015 the ICAPCD declared a no burn day **(Appendix A).** No complaints were filed for agricultural burning on May 7, 2015.

IV.1.c 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 Niland during the time of the May 7, 2015 PM_{10} 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 PM_{10} emissions. May 7, 2015 was officially designated as a NO burn day. No complaints were filed on May 7, 2015 related to agricultural or waste burning or dust.

FIGURE 4-2
PERMITTED SOURCES

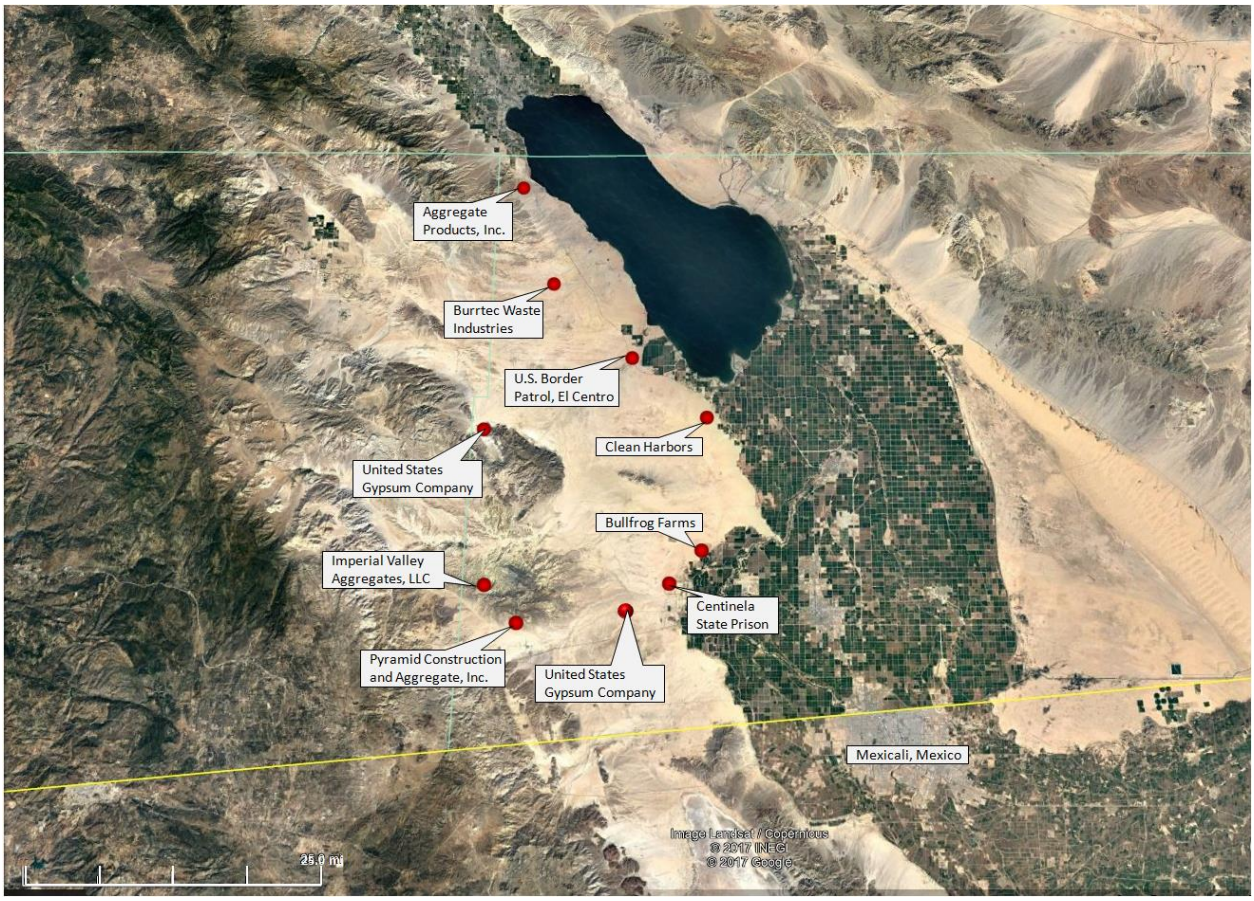


Fig 4-2: The above map identifies those permitted sources located west, northwest and southwest of the Niland monitor. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and Mexico. The green checker-boarded areas are a mixed use of agricultural and community parcels. In addition the desert areas are managed either by the Bureau of Land Management or the California Department of Parks

FIGURE 4-3
NON-PERMITTED SOURCES

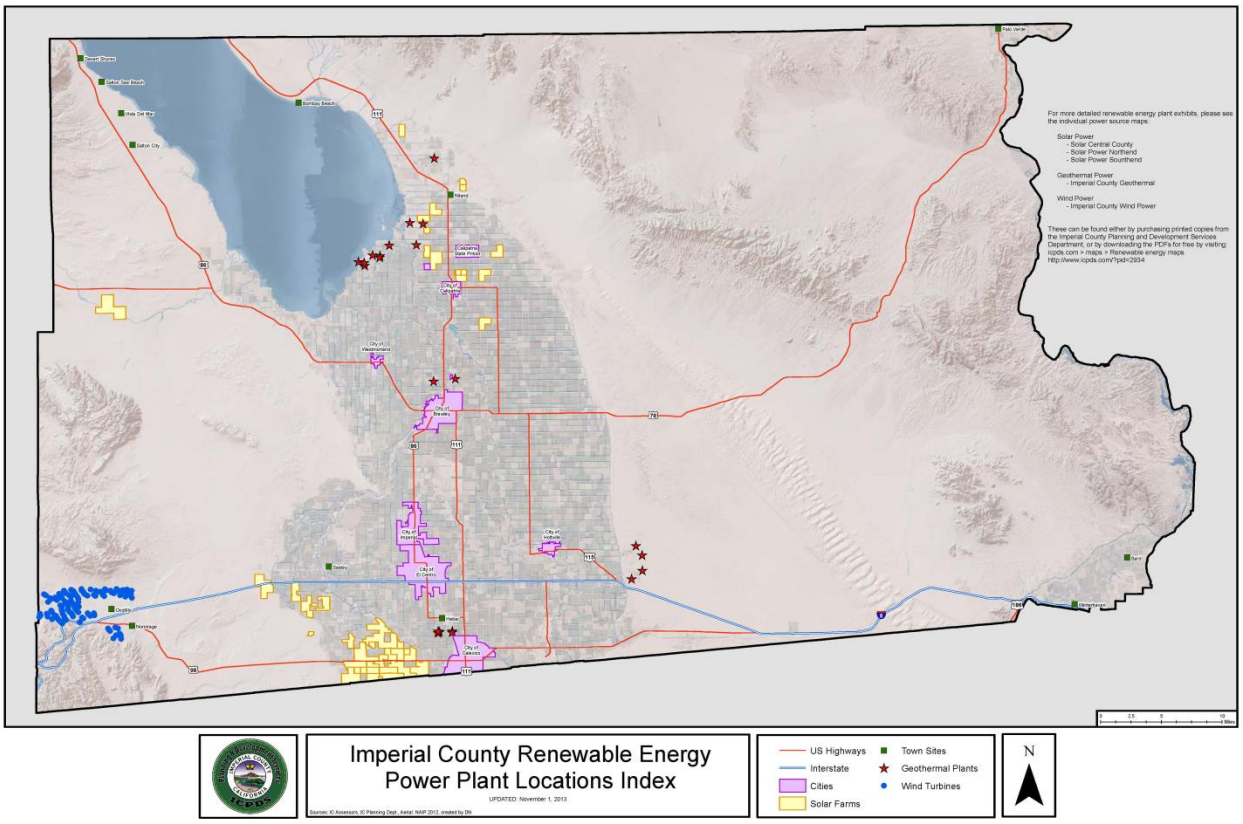


Fig 4-3: The above map identifies those power sources located west, northwest and southwest of the Niland monitor. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants

IV.2 Forecasts and Warnings

Wind and dust advisories were issued by the NWS as early as May 5, 2015. The NWS San Diego office issued a Wind Advisory at 12:42pm (1:42pm PDT) on Tuesday, May 5, 2015 for the San Diego County deserts. The advisory remained in effect from 3:00pm (4:00pm PDT) Wednesday, May 6, 2015 through 2:00am (3:00am PDT) Friday, May 8, 2015. The advisory similarly included potentially reduced visibility due to blowing dust and sand. By 1:00pm (2:00pm PDT) on May 5, 2015 the San Diego County mountain forecast included a slight chance of shower overnight for May 6, 2015 with a chance of measureable precipitation and thunderstorms by the evening of May 7, 2015. The NWS office in Phoenix issued its first Urgent Weather message on Thursday, May 7, 2015 at 2:06am (3:06 PDT/MST) which included a wind advisory and a warning of hazardous crosswind with potentially reduced visibility due to blowing dust and sand. The advisories warned of the potential for strong winds during the afternoon hours with wind speeds of between 25 and 30 mph, wind gusts of up to 45 mph

The issued advisories by the San Diego NWS office offer evidence of the tracking of the Pacific storm with impact to the San Diego mountains and deserts as early as May 6, 2015. Two issued descriptive text products for the smoke/dust observations in satellite imagery through 6:45pm May 6, 2015 and 6:30pm May 7, 2015 describe suspended dust across much of the southwestern United States which extended over the eastern Pacific and northwestern Mexico into southern California and further inland over much of Arizona and western New Mexico. While localized areas of blowing dust did occur the regional impact is evident. BACM controls where overwhelmed when strong gusty westerly winds entrained fugitive emissions from mostly dry areas outside of Imperial County into Imperial County and not only affected air quality but contributed significantly to the exceedance of May 7, 2015. By May 8, 2015 BACM controls where sufficient to control localized emissions within Imperial County mostly because moisture levels within the San Diego mountains and passed increased sufficiently to control entrained fugitive emissions. (see **Appendix A**)

The ICAPCD issued an Air Quality Alert at 6 p.m. on May 7, 2015 warning the public that air quality had reached the "Orange" or Unhealthy for Sensitive Groups level (PM_{10} 101-150µg/m^3). The notice read: "Be Advised: PM10 AQI 101-150 People with respiratory or heart disease, the elderly, and children are the groups most at risk, especially when they are physically active. There is an increased likelihood of respiratory symptoms in sensitive individuals, and aggravation of heart and lung disease and premature mortality in persons with cardiopulmonary disease and the elderly. U.S. EPA cautions that people with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion". **Appendix A** contains copies of the issued advisories and air quality alerts.

IV.3 Wind Observations

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. Imperial County Airport (KIPL) measured nine hours of winds at or above the 25 mph threshold. For 11 hours the airport reported gusts above 30 mph. El Centro NAF (KNJK) measured 11 hours of winds 25 mph or greater, with 12 hours of winds at or above 30 mph. Gusts above 50 mph were measured on five separate observations. The airfield reported winds of up to 40 mph as well as measuring gusts of up to 54 mph. See **Table 2-2**. Wind speeds of over 25 mph are normally sufficient to overcome most PM_{10} control measures. During the May 7, 2015 event wind speeds were above the 25 mph threshold overcoming the BACM in place.

IV.4 Summary

The weather and air quality forecasts and warnings outlined in this section demonstrate that strong winds were caused by a low pressure system passing through the region. The system brought unsettled weather which in turn created strong westerly winds across the mountains and deserts of southeastern California. Dust lofted and transported by the winds caused uncontrollable PM_{10} emissions. The BACM list as part of the control measures in Imperial County for fugitive dust emissions were in place at the time of the event. These control

measures are required for areas designated as "serious" non-attainment for PM_{10}, such as Imperial County. Thus, the BACM in place at the time of the event were beyond reasonable. In addition, surface wind measurements upstream of Niland and surrounding areas to the north and south of Niland during the event were high enough (at or above 25 mph, with wind gusts of 54 mph) that BACM PM_{10} control measures would have been overwhelmed.

Finally, a high wind dust event can be considered as a natural event, even when portions of the wind-driven emissions are anthropogenic, as long as those emissions have a clear causal relationship to the event and were determined to be not reasonably controllable or preventable. This demonstration has shown that the event that occurred on May 7, 2015 was not reasonably controllable or preventable despite the strong and in force BACM within the affected areas in Imperial County. This demonstration has similarly established a clear causal relationship between the exceedance and the high wind event timeline and geographic location. The May 7, 2015 event can be considered an exceptional event under the requirements of the exceptional event rule.

V Clear Causal Relationship

V.1 Discussion

Meteorological observations for May 7, 2015, identified a Pacific weather disturbance (storm) moving inland over the southwest that was enhanced by the presence of a strong upper level trough. The strong upper level trough associated with the storm brought strong and gusty west southwest winds with gusts exceeding 25 mph across the mountains and deserts of southeastern California. As early a May 6, 2015 during the late evening hours windblown dust slowly began to elevate (**Table 1-1**) and although winds decreased slightly during the morning hours of May 7, 2015 fugitive dust remained entrained. As gusty west southwest winds increased during the afternoon to evening hours of May 7, 2015 so too did concentrations of particulate matter. The Niland monitor measured the highest elevated levels of particulate matter during the afternoon hours of May 7, 2015 (**Figures 5-1 thru 5-3**).

The resulting entrained dust and accompanying high winds from the Pacific disturbance qualify this event as a "high wind dust event".[7] High wind dust events are considered natural events where the windblown dust is either from solely a natural source or from areas where anthropogenic sources of windblown dust are controlled with Best Available Control Measures (BACM). The following sections provide evidence that the May 7, 2015 high wind event qualifies as a natural event and that BACM was overwhelmed by the suddenness and intensity of the meteorological event.

Figures 5-1 thru 5-3 are satellite images that illustrate the impact of the westerly winds that were associated with the Pacific weather disturbance (storm) that moved inland over the southwest which was enhanced by the presence of a strong upper level trough on May 7, 2015. The strength and extent of the impact resulting from the entrained windblown dust can be visually seen as streaks of fugitive emissions are transported across California and into Arizona. **Figure 5-2** is a cropped, zoomed in image of **Figure 5-1** denoting the regional airfields that reported reduced visibility and or blowing dust on May 7, 2015. **Figure 5-3** is a Terra MODIS satellite image that shows the Aerosol Optical Depth over the region on May 7, 2015.[8] The darker hues, especially over the northern section of Imperial County, represent a moderately thick layer of aerosols that are suspended over portions of southeastern California and northern Mexico. **Appendix A** contains a supporting descriptive text of the blowing dust relative to the strong winds near the surface.

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[7] Title 40 Code of Federal Regulations part 50: §50.1(p) High wind dust event is an event that includes the high-speed wind and the dust that the wind entrains and transports to a monitoring site.

[8] Aerosol Optical Depth (AOD) (or Aerosol Optical Thickness) indicates the level at which particles in the air (aerosols) prevent light from traveling through the atmosphere. Aerosols scatter and absorb incoming sunlight, which reduces visibility. From an observer on the ground, an AOD of less than 0.1 is "clean" - characteristic of clear blue sky, bright sun and maximum visibility. As AOD increases to 0.5, 1.0, and greater than 3.0, aerosols become so dense that sun is obscured. Sources of aerosols include pollution from factories, smoke from fires, dust from dust storms, sea salt, and volcanic ash and smog. Aerosols compromise human health when inhaled by people, particularly those with asthma or other respiratory illnesses. Source: https://worldview.earthdata.nasa.gov.

FIGURE 5-1
MODIS SATELLITE IMAGE MAY 7, 2015

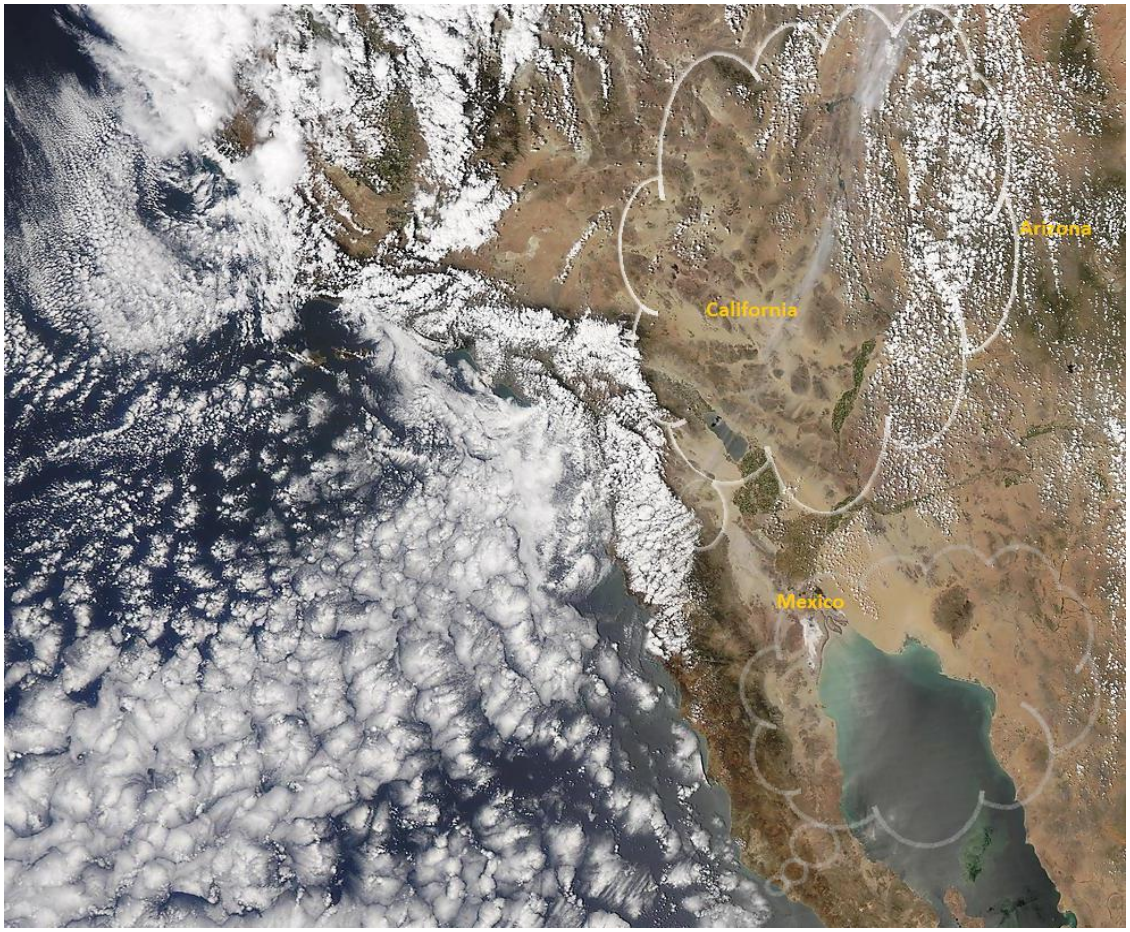


Fig 5-1: A MODIS Aqua satellite image captured dust-haze over the southwestern United States and northern Mexico. Image courtesy of Space Science and Engineering Center University of Wisconsin-Madison MODIS Today USA5: http://www.ssec.wisc.edu/

FIGURE 5-2
AIRFIELDS REPORTING REDUCED VISIBILITY OR HAZE OR BLOWING DUST

Fig 5-2: The amount of suspended windblown dust caused reduced visibility at a number of regional airfields. A MODIS Aqua satellite image captured ~13:30 shows a layer of haze over the region. Meteorological data from the NCEI's QCLCD system and the Satellite image from MODIS Today

FIGURE 5-3
AEROSOL OPTICAL DEPTH

Fig 5-3: A MODIS Terra satellite image captured the Aerosol Optical Depth (AOD) thickness over the region on May 7, 2015. Warmer colors indicate a thicker layer. Source: https://worldview.earthdata.nasa.gov/

The analysis of the meteorological setting, including weather reports and NWS satellite imagery, indicates that a Pacific weather disturbance (storm) moving inland over the southwest that was enhanced by the presence of a strong upper level trough brought strong and gusty west southwest winds with gusts exceeding 20 mph across the mountains and deserts of southeastern California.

FIGURE 5-4
NILAND RAMP-UP EXCEEDANCE FACTORS

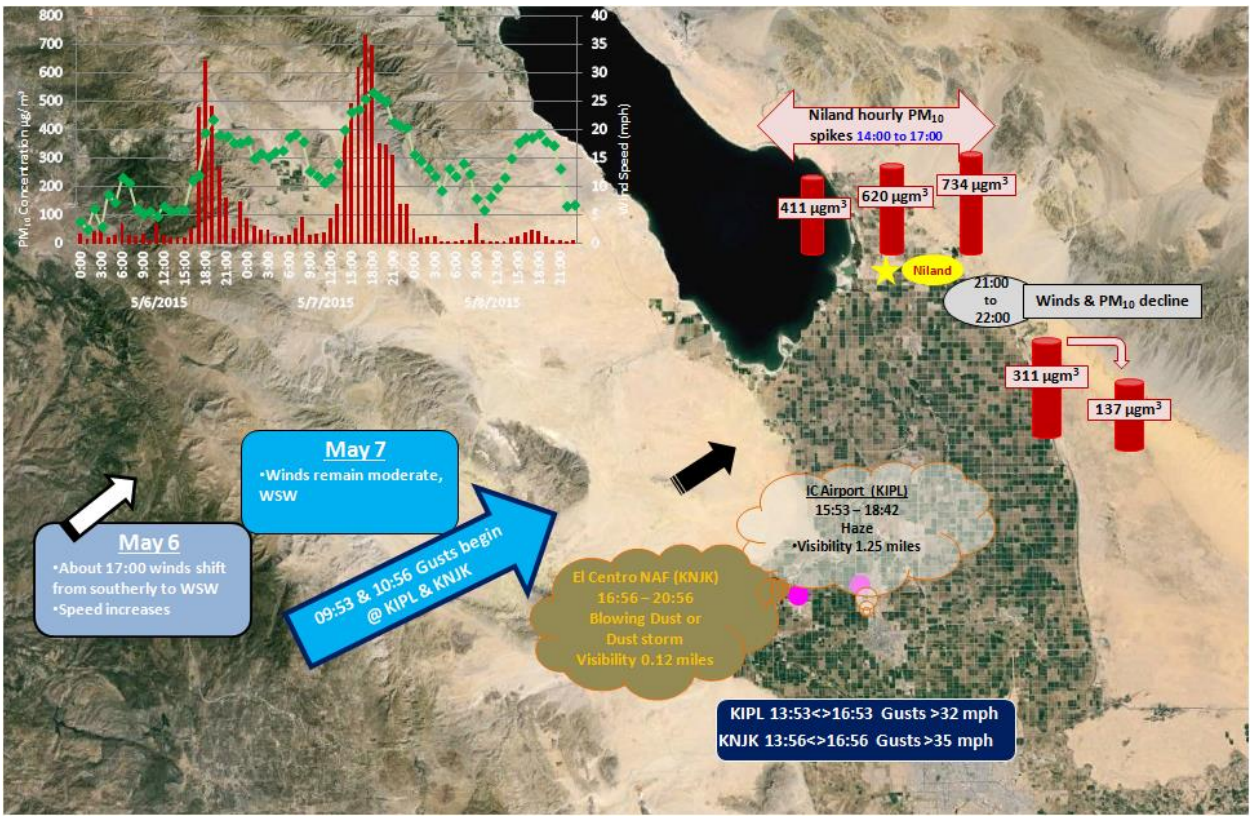


Fig 5-4: The ramp-up leading to the exceedance at Niland began late on May 6 when wind direction shifted to the WSW. Speed remained moderate going into May 7. About 06:00 on May 7, wind speeds begin to increase by mid-morning gusts begin to be measured. Niland PM_{10} concentrations continued to elevate from the previous evening peaking during the early evening hours of May 7, 2015. Air quality data is from the EPA's AQS data bank. Wind data is for KIPL and KNJK from the NCEI's QCLCD system. Google Earth base map

The chain of events for May 7, 2015 is visually demonstrated in **Figure 5-4**. As early as May 6, 2015, light to moderate westerly winds were measured throughout the day at both the Imperial County Airport (KIPL) and the El Centro NAF (KNJK). By late afternoon into the evening hours on May 6, 2015 both airports identify a consistent shift in wind direction from generally westerly to a west-southwest direction. Simultaneously, both wind speeds and gusts begin to gradually increase with a consistent elevated speed, 20 mph or above, by as early as 15:56

(KNJK). Although winds decrease slightly during the early morning hours of May 7, 2015 winds begin to elevate, 17 mph and above, for both airports as early as 6:56 (KNJK) and 6:53 (KIPL). By mid-morning on May 7, 2015 both airports begin to measure consistent elevated wind speeds and gusts, measuring the highest speeds during the evening hours (**Table 2-2**). Both airports begin measuring gusts mid morning KNJK at 10:56, 30 mph, and KIPL at 09:53, 22 mph. KNJK measured 13 consecutive hours of winds speeds above 25 mph while KIPL measured approximately 8 hours of multiple wind speeds at or above 25 mph. On May 7, 2015 strong west-southwest winds with powerful gusts were sufficient enough to affect air quality when winds elevated PM_{10} levels during the evening hours of May 6, 2015 impacting the Niland station on May 7, 2015. Early on May 8, 2015 winds begin to calm down. (**Figures 5-6 and 5-7**)

While the wind driven entrained dust particles resulted in elevated concentrations of PM_{10} throughout Imperial County (**Table 1-1**) only the Niland monitor measured an exceedance of the NAAQS with a (midnight to midnight) 24-hr average concentration of 210.2µg/m^3. Although the Brawley and Calexico sites measured elevated concentrations of PM_{10} on May 7, 2015, it was not enough to cause an exceedance. Like Niland, the Brawley FEM monitor more likely than not would have exceeded the NAAQS where it not for two invalided hours between the two of the highest elevated concentrations measured during the late afternoon to evening hours, measurements of 839µg/m^3 and 531µg/m^3 during the 16:00 hour and 19:00 hour, respectively.

FIGURE 5-5
5 DAY NILAND PM_{10} CONCENTRATIONS & WIND SPEED CORRELATION

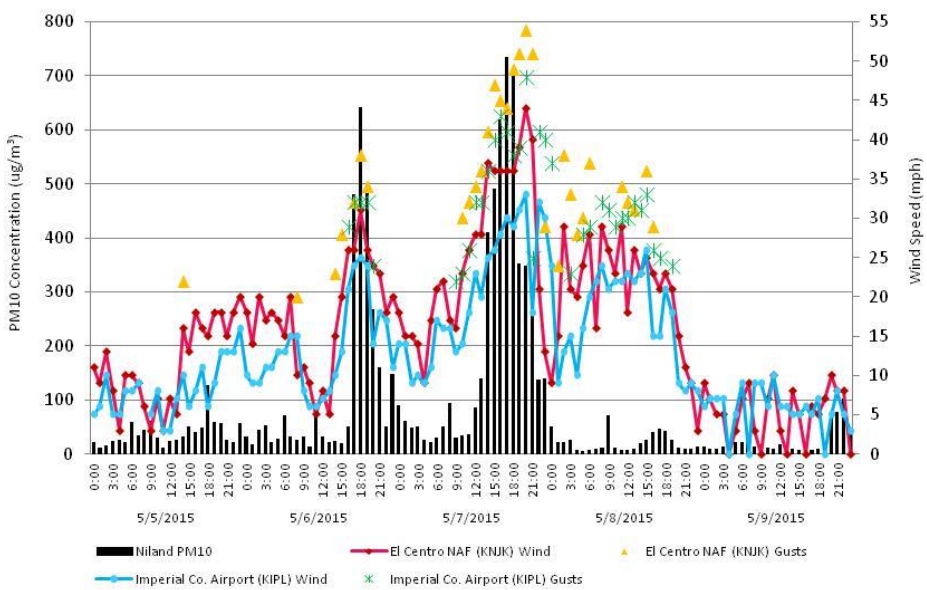


Fig 5-5: Niland PM_{10} concentrations beginning with May 5, 2015 a non-event day and ending with May 9, 2015 a non-event day. The graph shows a correlation between elevated high winds and concentrations during before and after the event. The station saw four hours at or above the 25 mph threshold. Air quality data and wind data from the EPA's AQS data bank

Figures 5-6 demonstrates the temporal relationship between the high winds and the transported entrained dust impacting the Niland monitor. The correlation of hourly BAM 1020 data from the Niland air monitoring station and the elevated wind speeds on May 7, 2015 indicate that as wind speeds increased so did concentrations of PM_{10}. Additional correlating graphs are found in **Appendix C**.

FIGURE 5-6
NILAND PM_{10} CONCENTRATIONS & WIND SPEED CORRELATION

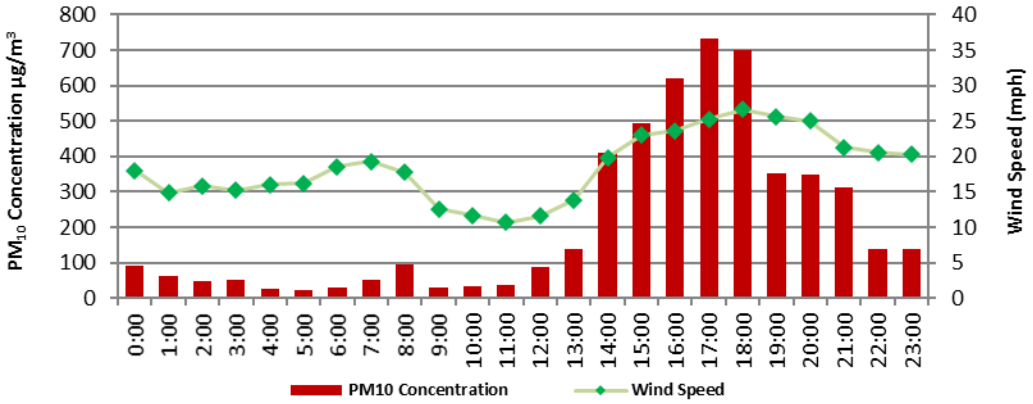


Fig 5-6: Niland PM_{10} concentrations show a correlation between elevated high winds and concentrations. The station saw four hours at or above the 25 mph threshold. Air quality data and wind data from the EPA's AQS data bank

To understand the totality of the regional impact and the impact to the Niland monitor, **Figures 5-7 and 5-8** provide a three-day depiction of PM_{10} concentrations and wind speeds at regional and surrounding sites. Representative locations include those sites west, west-southwest of Niland. Nearly all sites increase in concentration on May 7 as wind speeds rose. All sites but Palm Springs Fire station showed large increases on May 7. Although winds remained somewhat elevated on May 8, 2015 concentrations decreased as moisture levels within the San Diego mountain and desert areas increased due to overnight rainfall and snow. The arid nature of the San Diego mountain passes and deserts significantly contributes to the increases in entrained fugitive emissions impacting Imperial County. For May 8, 2015, the increased moisture levels within the San Diego mountain passes and deserts helped to contain the amount of fugitive emissions entrained by westerly winds.

FIGURE 5-7
72 HOUR PM_{10} CONCENTRATIONS & WIND SPEEDS REGIONAL SITES

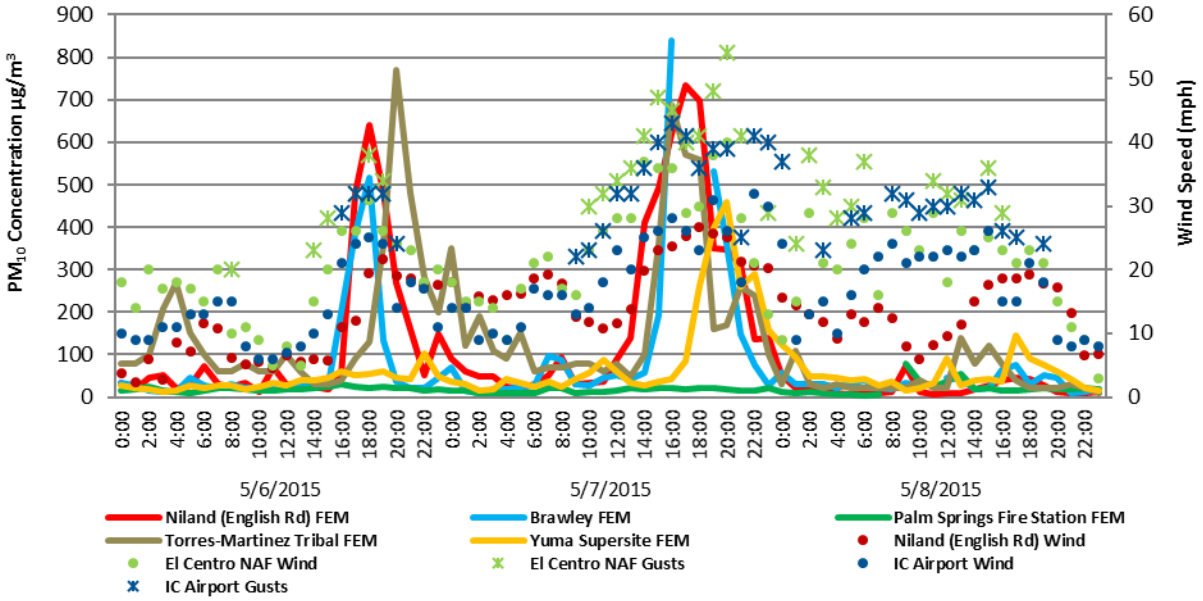


Fig 5-7: Is the graphical representation of the 72-hour PM_{10} concentrations at various monitoring locations throughout Riverside, Imperial, and Yuma counties. All sites except Palm Springs Fire Station saw significantly increased hourly concentrations during the latter part of May 7. Air quality data from the EPA AQS data bank

FIGURE 5-8
72 HOUR PM_{10} CONCENTRATIONS & WIND SPEEDS VARIOUS SITES

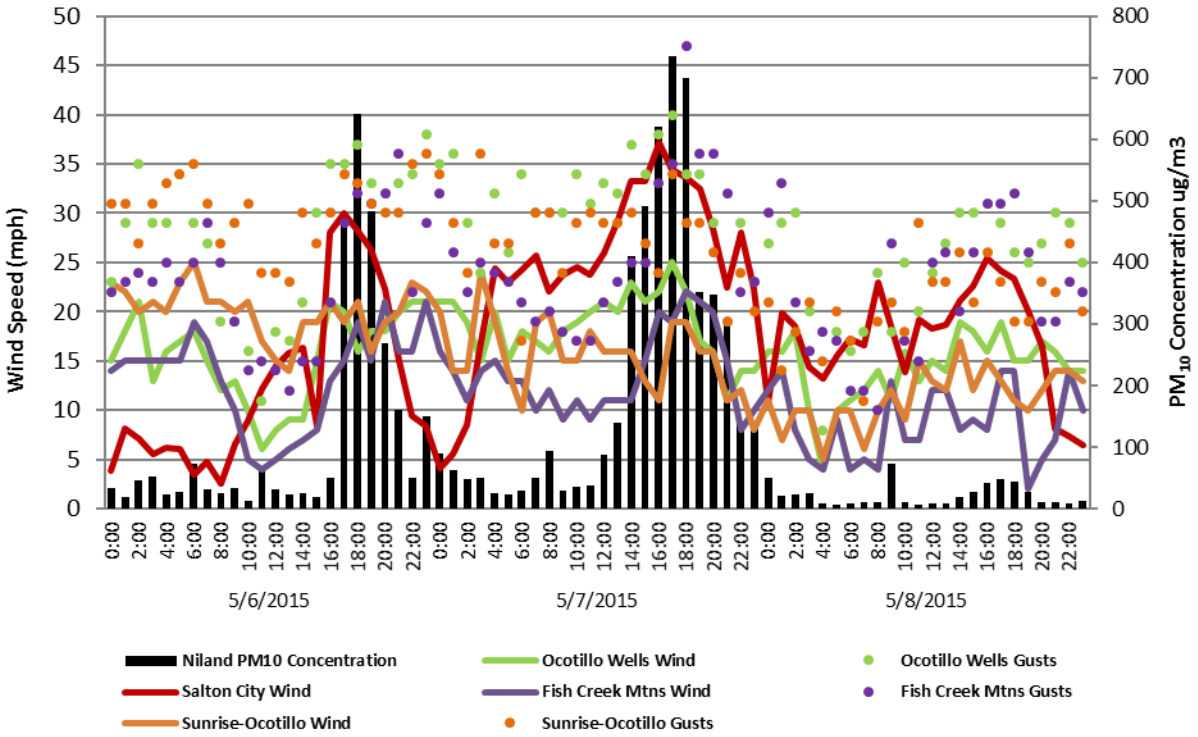


Fig 5-8: Is a graph demonstrating the correlation between wind speeds at various non-regional sites to Nilands hourly PM_{10} concentrations

Wind advisories are issued by the NWS when winds[9] of 30 to 39 mph are expected for one (1) hour or longer. As mentioned above, the NWS issued two Urgent Weather Messages for Thursday, May 7, warning of potential high winds for a wide area of Imperial County, including Brawley, Calexico, El Centro, Glamis, Imperial, and the Salton Sea. A Blowing Dust Advisory was issued at 10:44 p.m. for Joshua Tree National Park south to El Centro and Interstate 8 in Imperial County. Earlier at 1:42 p.m. on May 5 the NWS San Diego office issued a wind advisory that included the San Diego County deserts (see **Appendix A**). For detailed meteorological station graphs see **Appendix B**. **Figure 5-9** is an illustration of regional wind speeds beginning with May 6 and ending May 8, 2015. As the system moved into the region wind speeds became elevated throughout the afternoon and evening hours on May 7, 2015. Winds started to diminish during late evening on May 7, 2015.

[9] National Weather Service; NOAA's Glossary – Wind Speed: The rate at which air is moving horizontally past a given point. It may be a 2-minute average speed (reported as wind speed) or an instantaneous speed (reported as a peak wind speed, wind gust, or squall)[http://w1.weather.gov/glossary/index.php?letter=w]

FIGURE 5-9
72 HOUR WIND SPEEDS AT REGIONAL SITES

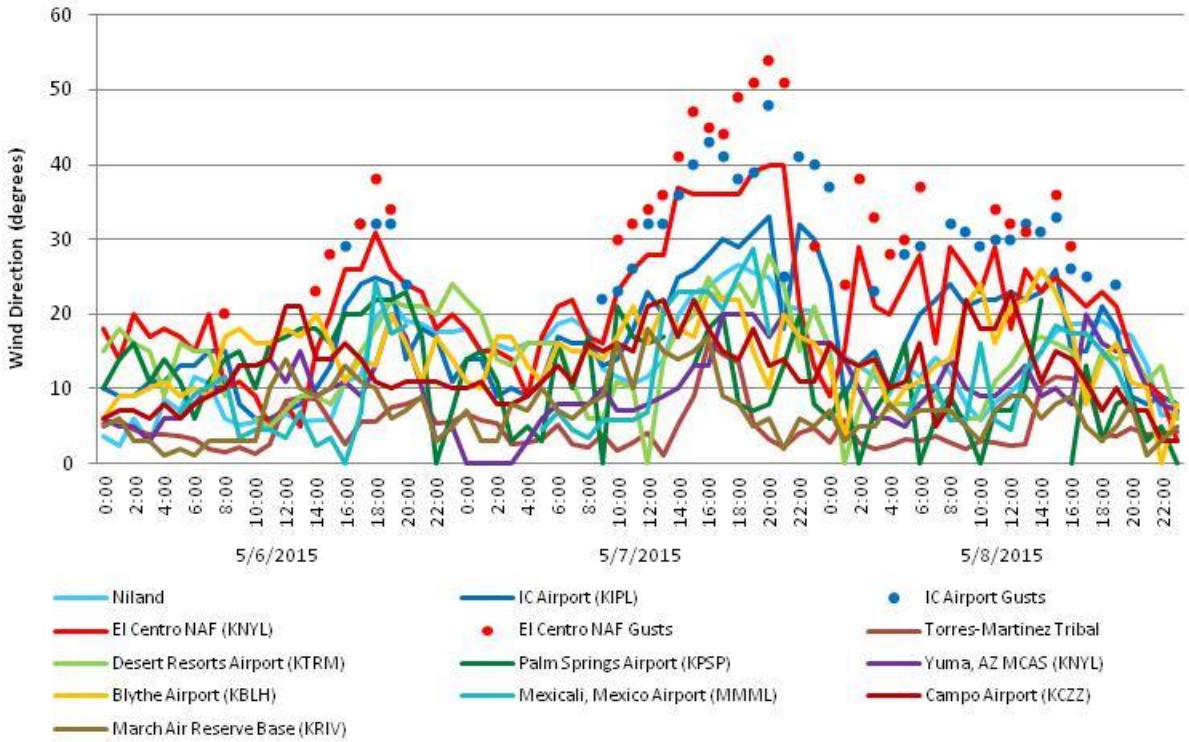


Fig 5-9: Meteorological data from regional sites show a uniform spike in wind speed during the May 7, 2015 exceptional event

Figure 5-10 shows the lowered visibility that resulted as high winds kicked up dust and sand in southeastern California. Both El Centro NAF (KNJK) and Imperial County Airport (KIPL) experienced significantly reduced visibility. At 17:57 on May 7 KIPL had a minimum visibility of 1.25 miles due to haze. All together, the airport reported five hours of reduced visibility to haze. KNJK had five hours of blowing dust and one hour of either heavy dust storms or dust storms with sand being reported. Minimum visibility occurred at 19:14 and 20:37 when observed visibility was .12 miles.

FIGURE 5-10
72 HOUR PM_{10} CONCENTRATIONS AND VISIBILITY
IMPERIAL AIRPORT & EC NAVAL AIRFIELD

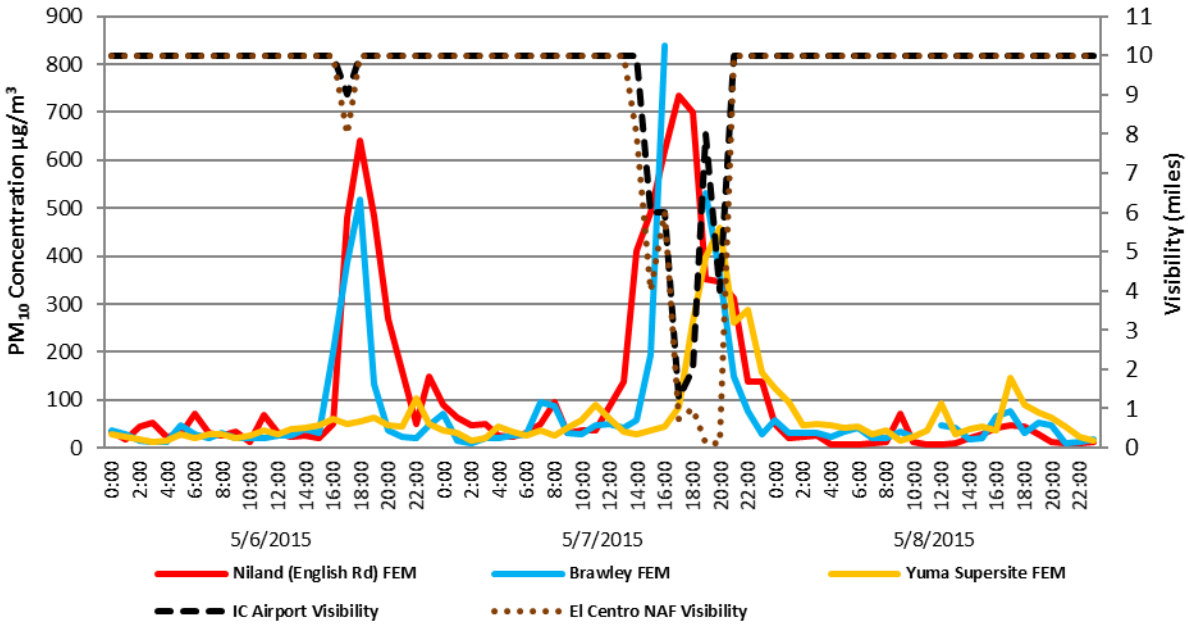


Fig 5-10: Illustrates the relative visibility levels for the day before, the after and on May 7, 2015. Visibility, as reported from the Imperial County Airport (KIPL) and El Centro NAF (KNJK). The graph illustrates the PM_{10} concentrations, relative to visibility. All stations show a comparable pattern between visibility and concentrations. Yuma is MST

Figure 5-11 is the resultant Air Quality Index (AQI) for May 7, 2015.[10] The Air Quality Index for May 7, 2015 was in the "Moderate" or Yellow category from 1 a.m. to 4 p.m. At 5 p.m. the AQI rose to the "Unhealthy for Sensitive Groups or "Orange" where it remained until 12 a.m. This was in response to the fugitive dust that had been transported by high winds into Imperial County and affected the quality of air around Niland. See **Appendix A** for the issued Air Quality Alert.

[10] 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 effects 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 5-11
IMPERIAL VALLEY AIR QUALITY INDEX FOR NILAND MAY 7, 2015

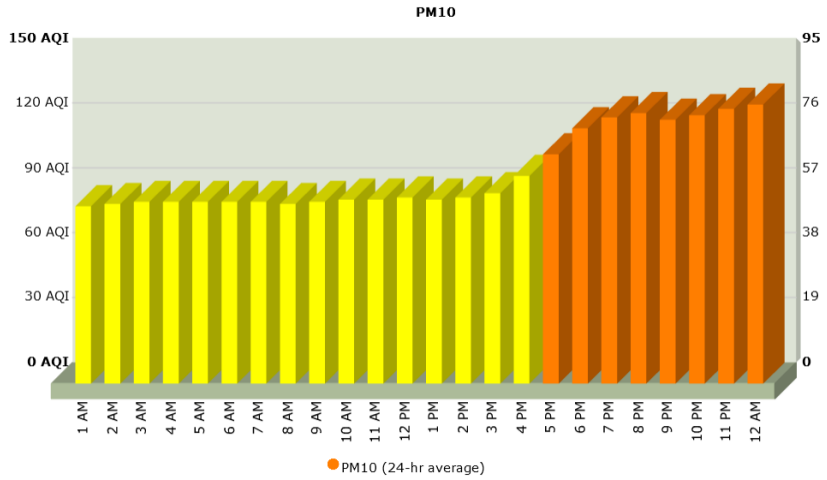
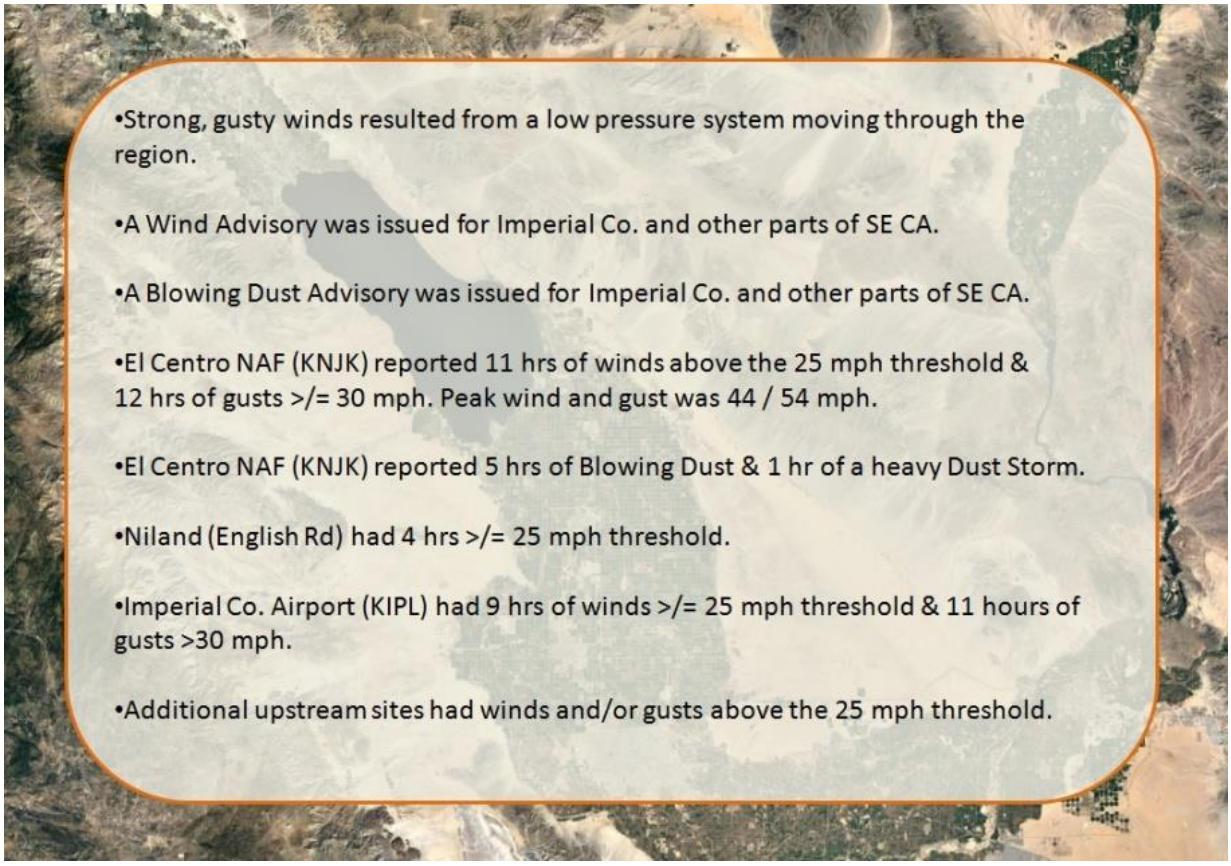


Fig 5-11: Demonstrates that air quality in Imperial County was affected when an upper-level trough of low pressure moved through southern California generating strong winds associated with and entraining dust and impacting the Imperial County monitors on May 7, 2015

V.2 Summary

The preceding discussion, graphs, figures, and tables provide wind direction, wind speed and PM_{10} concentration data illustrating the spatial and temporal representation of the high westerly winds associated with the Pacific weather disturbance (storm) that moved inland over the southwest that was enhanced by the presence of a strong upper level trough. The information provides a clear causal relationship between the entrained windblown dust and the PM_{10} exceedance measured at the Niland monitor on May 7, 2015. Furthermore, the wind and dust advisories and issued air quality alert illustrate the effect upon air quality within the region extending from all of Imperial County, the southern portion of Riverside County and Arizona. The entrained dust originated from as far as the mountains and desert slope areas located within San Diego County (part of the Sonoran Desert). Combined, the information demonstrates that the elevated PM_{10} concentrations measured on May 7, 2015 coincided with high wind speeds and that gusty west winds were experienced over the southern portion of Riverside County, southeastern San Diego County, all of Imperial County, and parts of Arizona.

FIGURE 5-12
MAY 7, 2015 EXCEPTIONAL EVENT TAKEAWAY POINTS



VI Conclusions

The PM_{10} exceedance that occurred on May 7, 2015, satisfies the criteria of the EER which states that in order to justify the exclusion of air quality monitoring data evidence must be provided for the following elements:

TABLE 7-1 Technical Elements Exceptional Event Demonstration for High Wind Dust Events (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)	Pgs 6-29
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	Pgs 43-54
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	Pgs 30-34
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	Pgs 35-42
5	A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event	Pgs 21-29 & 40-41

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 V, we can reasonably conclude that there exists a clear causal relationship between the monitored exceedance and the May 7, 2015 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 litter or no

direct causal role. This demonstration provides evidence that despite BACM in place within Imperial County, high winds overwhelmed all BACM controls where human activity played little to no direct causal role. The PM_{10} exceedance measured at the Niland monitor were caused by naturally occurring strong gusty west winds that transported fugitive dust into Imperial County and other parts of southern California from areas located within the Sonora Desert regions to the west and southwest of Imperial County. These facts provide strong evidence that the PM_{10} exceedance on May 7, 2015, were not reasonably controllable or preventable.

VI.3 Natural Event

The revised preamble to the EER clarifies that a "Natural Event" (50.1(k) of 40 CFR Part 50) is an event and its resulting emissions, which may recur at the same location where anthropogenic sources that are reasonably controlled are considered not to play a direct role in causing emissions, thus meeting the criteria that human activity played little or no direct causal role. As discussed within this demonstration, the PM_{10} exceedance which occurred in Niland on May 7, 2015, was caused by the transport of fugitive dust into Imperial County by strong westerly winds associated with the passage of low pressure system and surface trough that was situated between southeastern California and southwestern Arizona. At the time of the event anthropogenic sources were reasonably controlled with BACM. The event therefore qualifies as a natural event.

VI.4 Clear Causal Relationship

The time series plots of PM_{10} concentrations at Niland during different days and the comparative analysis of different areas in Imperial and Riverside County monitors demonstrates a comparable and consistent pattern of elevated gusty west winds and concentrations of PM_{10} at the Niland monitor on May 7, 2015 (Section V). In addition, these time series plots and graphs demonstrate that the high PM_{10} concentrations and the gusty west winds were an event that was widespread, regional and not preventable. Similar days, at the Niland station, non-event days, before May 6, 2015 and after the high wind event, May 9, 2015 had PM_{10} concentrations well below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the entrained fugitive emissions to the exceedance on May 7, 2015.

VI.5 Historical Concentrations

The historical annual and seasonal 24-hr average PM_{10} values measured at the Niland monitor were historically unusual compared to a multi-year data set (Section IV).

Appendix A: Public Notification that a potential event was occurring (40 CFR §50.14(c)(1)(i))

This section contains wind advisories, dust advisories, and an air quality alert issued by the NWS and Imperial County on May 7, 2015. In addition, this Appendix contains the air quality alert issued by Imperial County advising sensitive receptors of potentially unhealthy conditions in

Imperial County resulting from the strong gusty winds. The data show a region-wide increase in wind speeds and wind gusts coincident with the arrival of dust and high PM_{10} concentrations in Imperial County.

Appendix B: Meteorological Data.

This Appendix contains individual station graphs, a station map, wind roses, and QCLCD data. The data demonstrates the regional impact of the wind event.

Appendix C: Correlated PM_{10} Concentrations and Winds.

This Appendix contains the graphs depicting the correlations between PM_{10} concentrations and elevated wind speeds for selected monitors in Imperial and Riverside counties. These graphs demonstrate the regional impact by the wind event.

Appendix D: Regulation VIII – Fugitive Dust Rule.

This Appendix contains the compilation of the BACM adopted by the Imperial County Air Pollution Control District and approved by the United States Environmental Protection Agency. A total of seven rules numbered 800 through 806 comprise the set of Regulation VIII Fugitive Dust Rules.