

2016 Annual Network Plan for Ambient Air Monitoring

July 1, 2016



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Air Quality Management District
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Table of Contents

Definition of Terms.....	3
Executive Summary.....	4
Network Design.....	5
Maps of Station Locations.....	6
Minimum Monitoring Requirements.....	10
Quality Control.....	14
Collocation.....	14
Recent or Proposed changes to Network.....	15
Review of Changes to PM2.5 Monitoring Network.....	15
Data Submission Requirements.....	16
Data Availability.....	16
Detailed Site Information.....	17
Jacobs.....	17
Humboldt Hill.....	20
Weaverville.....	23
Crescent City.....	25

Attachments

Attachment A - EPA Grimm Waiver Approval Letter, May 2016.....	27
Attachment B - Grimm to FRM Comparison Operational Improvement Plan.....	30

Definition of Terms

AAC	Atmospheric Analysis and Consulting
AQI	Air Quality Index
AQS	Air Quality System
BAAQMD	Bay Area Air Quality Management District
CARB	California Air Resources Board
E-BAM	Emergency Beta-Attenuation Monitor
FEM	Federal Equivalency Method
FRM	Federal Reference Method
MSA	Micropolitan Statistical Area
NAAQS	National Ambient Air Quality Standards
NOAA	National Oceanographic and Atmospheric Administration
NCUAQMD	North Coast Unified Air Quality Management District
POC	Parameter Occurrence Code
PQAO	Primary Quality Assurance Organization
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Station
SOP	Standard Operating Procedure
SPM	Special Purpose Monitor
TRS	Total Reduced Sulfur

Executive Summary

The North Coast Unified Air Quality Management District's (District) "2016 Annual Network Plan for Ambient Air Monitoring" is an examination of the District's network of ambient air pollution monitoring stations. This annual review of the District's air monitoring network is required by Title 40, Code of Federal Regulations, Part 58.10 (40 CFR 58.10). The report meets the requirements for an annual network plan as listed in 40 CFR 58.10, Appendix A.

The District is located in the far northwestern portion of California. It has jurisdiction over Humboldt, Del Norte, and Trinity Counties, which together cover 7,753 square miles. It is bordered on the west by the Pacific Ocean and extends from the Oregon Border south approximately 140 miles to the Mendocino County line. Eureka, the county seat of Humboldt County, is 284 miles north of San Francisco, 466 miles south of Portland, Oregon and on the coast of the Pacific Ocean. The area is made up of varied terrain, from coastal wetlands to rugged mountains. Inversions and diurnal offshore wind patterns are common.

The air in Humboldt, Del Norte and Trinity County is considered to be either unclassified, or in attainment of State and Federal Ambient Air Quality Standards except for the State's 24-hour PM₁₀ standard in Humboldt County. The two pollutants of greatest concern are ozone and particulate matter. The county's sunny climate, pollution-trapping mountains and valleys, along with a growing population, all contribute to the problem.

The District is rich with monitoring network history. Total Reduced Sulfur (TRS) started to be monitored in the 70s at Fort Humboldt, fueled by concerns about practices at the pulp mills. Numerous special studies, including speciation, have occurred around Humboldt Bay. The very first time the California Air Resources Board (ARB) mobile monitoring trailer was deployed it was to Humboldt County to investigate concerns around the Humboldt Flakeboard Panel plant in Arcata. Beginning in 1986, PM₁₀ monitoring began with a solitary PM₁₀ monitoring sampler in Eureka. Currently there are four air monitoring stations in operation.

The District only has a few major Title V sources, all are located within Humboldt County: Eel River Power (Scotia), PG&E Humboldt Bay Generating Station (Eureka), DG Fairhaven (Samoa), and the Blue Lake Power Plant (Blue Lake). In addition to these major sources, the District is impacted by several large saw mills, minor industrial sources, and mobile sources throughout the traffic corridors. The District is also challenged by particulate pollution, primarily wood smoke in the winter and wildfires in the summer.

This report will be available for a 30-day public inspection period. Any comments received during the public inspection period will be forwarded to the United States Environmental Protection Agency (EPA) concurrently with submittal of the plan. Changes suggested in the comments will be addressed in subsequent plan updates. This report may be viewed on the District's website, www.ncuagmd.org and hardcopies are available for review at District's office. Written comments should be submitted to the North Coast

Network Design

The District operated four monitoring sites in 2015. The following maps show the locations of the monitoring sites. Tables 1 and 2 list the pollutants measured at each site.

Table 1. List of Special Purpose Monitoring Sites

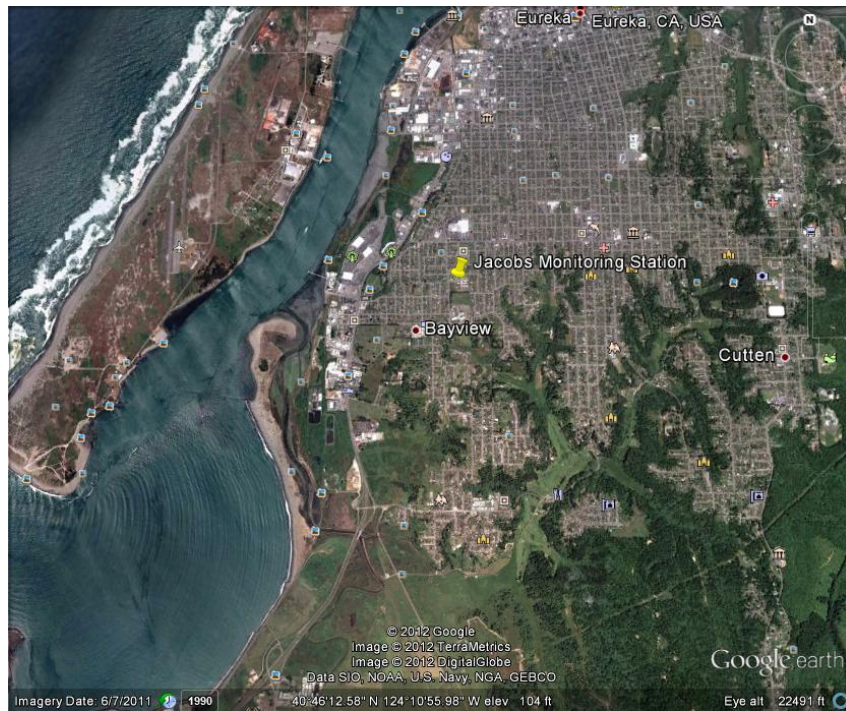
Site Name	AQS Site #	Pollutant Monitored
Humboldt Hill	060231005	PM _{2.5} , O ₃ , NO ₂ , CO, SO ₂
Crescent City	060150006	PM _{2.5}

Table 2. List of State and Local Air Monitoring Sites

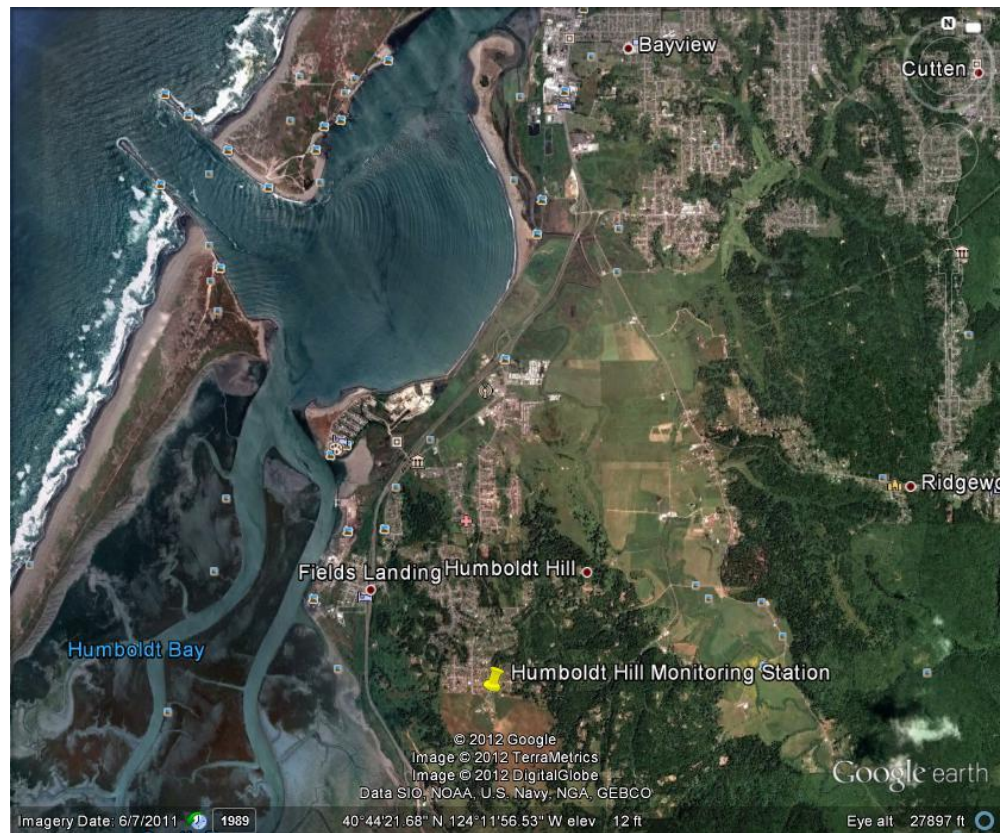
Site Name	AQS Site #	Pollutants Monitored
Jacobs	060231004	PM ₁₀ , PM _{2.5} , O ₃ , NO ₂ , CO, SO ₂
Weaverville	061050002	PM _{2.5}

Monitoring Station Locations

Jacobs Monitoring Station (717 South Ave, Eureka, Humboldt County)



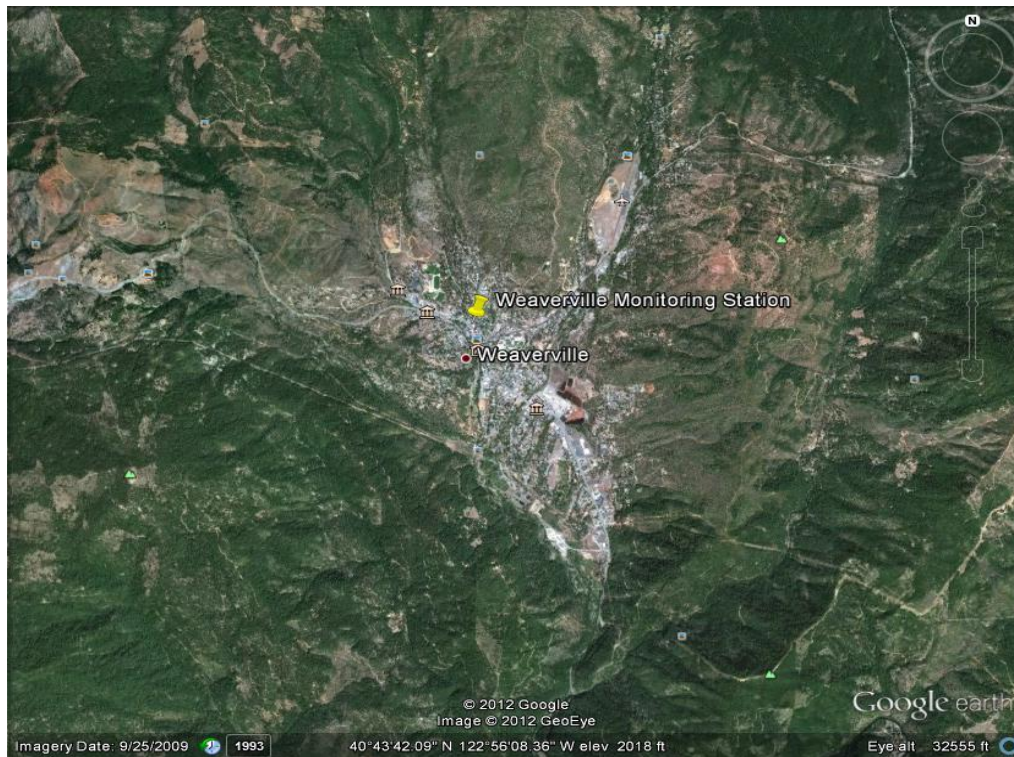
Humboldt Hill Monitoring Station (7333 Humboldt Hill Rd., Eureka, Humboldt County)



Crescent City Monitoring Station (994 G Street, Crescent City, Del Norte County)



Weaverville Monitoring Station (11 Court Street, Weaverville, Trinity County)



Minimum Monitoring Requirements

This network meets the minimum monitoring requirements for all criteria pollutants (Tables 3-11).

Ozone

Table 3. Minimum Monitoring Requirements for Ozone Sites.

Micropolitan Statistical Area	County	Pop. In Year 2010	4th highest 8-hour max. (ppm) (2013-2015)	3 year design value	SLAMS Ozone Sites Required	Active SLAMS Ozone Sites	Active Ozone SPMs	Sites Needed
Eureka-Arcata-Fortuna	Humboldt	134,623	Jacobs 0.045	Jacobs 0.044	0	1	1	0
			Humboldt Hill 0.047	Humboldt Hill 0.045				
Crescent City	Del Norte	28,610	-	-	0	0	0	0
none	Trinity	13,786	-	-	0	0	0	0

No monitors are required for either a SIP or Maintenance Plan. The District monitors Ozone as an examination of population exposure levels. Since NCUAQMD has no required ozone sites, it is not necessary to identify the maximum concentration ozone site.

PM 2.5

Table 4. Minimum Monitoring Requirements for FRM PM_{2.5} Sites.

Micropolitan Statistical Area	County	Pop. In Year 2010	Annual Design Value (ug/m ³) (2013-2015)	Daily Design Value (ug/m ³) (2013-2015)	FRM Sites Required	SLAMS Sites Active	SPM Sites Active	Sites Needed
Eureka, Arcata, Fortuna	Humboldt	134,623	Jacobs 7.3	Jacobs 22	0	1	1	0
			Humboldt Hill 5.0	Humboldt Hill 13				
Crescent City	Del Norte	28,610	-	-	0	0	0	0
none	Trinity	13,786	-	-	0	0	0	0

Since NCUAQMD has no required FRM PM_{2.5} sites, it is not necessary to identify the maximum concentration PM_{2.5} site

Table 5. Minimum Monitoring Requirements for Continuous PM_{2.5} Sites.

Micropolitan Statistical Area	County	Pop. In Year 2010	SLAMS FEM Sites required	SLAMS Sites Active	SPM Sites Active
Eureka, Arcata, Fortuna	Humboldt	134,623	0	0	1*
Crescent City	Del Norte	28,610	0	0	1*
none	Trinity	13,786	0	1	0

* Grimm 180

Table 6. Collocation of continuous PM_{2.5} monitors

Method Code	# Primary Monitors	POC designations	Required Collocated monitors	Active Collocated FRM monitors	Active Collocated FEM Monitors
195	1	1	0	1	0
731	1	1	0	0	0

Collocation the responsibility of the PQAO. NCUAQMD works with the ARB PQAO to assist wherever possible.

No PM_{2.5} monitors are required for either a SIP or Maintenance Plan.

PM10

Table 7. Minimum Monitoring Requirements for PM₁₀ Sites.

Micropolitan Statistical Area	County	Population in Year 2010	Max Concentration (2013-2015) ($\mu\text{g}/\text{m}^3$)	SLAMS Sites Required	SLAMS Sites Active	SPM Sites Active	Sites Needed
Eureka, Arcata, Fortuna	Humboldt	134,623	Jacobs 104	0	1	0	0
Crescent City	Del Norte	28,610	-	0	0	0	0
none	Trinity	13,786	-	0	0	0	0

NO2

Table 8. Minimum Monitoring Requirements for NO₂ Monitors.

Micropolitan Statistical Area	County	Population in Year 2010	Annual Design Value (ppb) (2013-2015)	SLAMS Monitors Required	Active SLAMS Monitors	Active SPM Monitors	Monitors Needed
Eureka-Arcata, Fortuna	Humboldt	134,623	Jacobs 3.2	0	1	1	0
			Humboldt Hill 1.0				
Crescent City	Del Norte	28,610	-	0	0	0	0
none	Trinity	13,786	-	0	0	0	0

No monitors are required for SIP or Maintenance Plans. The District monitors NO₂ in Humboldt County to examine population exposure. Based on population, no near-road NO₂ monitors are required within the District boundaries.

SO₂

Table 9. Minimum Monitoring Requirements for SO₂ Monitors.

Micro-politian Statistical Area	County	Pop. in Year 2010	Annual Design Value (ppb) (2013-2015)	Max 24 hour (ppb) (2013-2015)	Max 1 hour (ppb) (2013-2015)	SLAMS Monitors Required	Active SLAMS Monitors	Active SPM Monitors	Monitors Needed
Eureka-Arcata, Fortuna	Humboldt	134,623	Jacobs 0.1	Jacobs 1.2	Jacobs 1.3	0	1	1	0
			Humboldt Hill 0.0	Humboldt Hill 0.3	Humboldt Hill 0.7				
Crescent City	Del Norte	28,610	-	-	-	0	0	0	0
none	Trinity	13,786	-	-	-	0	0	0	0

No monitors are required for SIP or Maintenance Plans. The District is not required to monitor SO₂. The District monitors SO₂ in Humboldt County to examine population exposure.

CO

Table 10. Minimum Monitoring Requirements for CO Monitors.

Micro-politian Statistical Area	County	Pop. in Year 2010	8-hour Design Value (ppm) (2013-2015)	1 hour. Design Value (2013-2015)	SLAMS Monitors Required	Col-located Monitors Required	Active SLAMS Monitors	Active SPM Monitors	Monitors Needed
Eureka-Arcata-Fortuna	Humboldt	134,623	Jacobs 0.9	Jacobs 1.9	0	0	1	1	0
			Humboldt Hill 0.7	Humboldt Hill 0.8					
Crescent City	Del Norte	28,610	-	-	0	0	0	0	0
none	Trinity	13,786	-	-	0	0	0	0	0

No monitors are required for SIP or Maintenance Plans. The District is not required to monitor CO. The District monitors CO in Humboldt County to examine population exposure.

Pb

Table 11. Minimum Monitoring Requirements for Pb.

MSA	County	Pop. In Year 2010	Annual Design Value	Monitors Required	Active Monitors	Monitors Needed
Eureka, Arcata, Fortuna	Humboldt	134,623	-	0	0	0
Crescent City	Del Norte	28,610	-	0	0	0
none	Trinity	13,786	-	0	0	0

No monitors are required for SIP or Maintenance Plans. The District is not required to monitor Pb and does not do so.

Quality Control

The District is a member of the ARB Primary Quality Assurance Organization (PQAO). All District ambient air monitoring meets stringent ARB Quality Control and Quality Assurance requirements. ARB audit records and site information for the District can be found on the ARB website at www.arb.ca.gov/aqgm/qa/qa.htm, or obtained by contacting the District at (707) 443-3093.

District PM_{2.5} FRM filters are analyzed by the Bay Area Air Quality Management District (BAAQMD). The Bay Area Air Quality Management District Laboratory meets stringent Federal Requirements for Quality Control and Quality Assurance. Information regarding the laboratory can be found on the BAAQMD website at <http://www.baaqmd.gov>.

Collocation

The District is a member of the ARB PQAO and relies on the ARB PQAO network to satisfy all collocation requirements. (CFR 58 App A 3.2.5).

The District does not have any permanently collocated PM_{2.5} samplers. It currently operates one collocated FRM PM_{2.5} sampler. A FEM Grimm 180 has been collocated with this instrument since March 2013 at Humboldt Hill, for the purpose of comparing the FEM data to an FRM instrument. It has been found that during the period March 2013-December 2015, this Grimm 180 (serial number 18A11018) did not produce data of sufficient comparability to the PM_{2.5} FRM to allow for comparison to NAAQSs. The July 2015 Waiver Request for this instrument was approved in May 2016 (Attachment A).

It is commonly hypothesized that the issue with Grimm vs FRM comparability is a design flaw, as opposed to an instrument problem. Thus, it is planned to continue the comparison study at Humboldt Hill, but to test the other Grimm instrument owned by NCUAQMD. There will be an exchange of the Grimm instrument currently located in Crescent City (serial number 18A10013) with the Grimm 180 which recently completed the comparison study at Humboldt Hill (serial number 18A11018). The distance between NCUAQMD headquarters and the Crescent City Monitoring Site precludes the possibility of running the comparison on site at the Crescent City Station.

Recent or Proposed Modifications to Network

The District began operating a GRIMM 180 instrument in Crescent City in April 2016. This Grimm 180 monitor is located a short distance from the original Crescent City monitoring location. It is a SPM monitor, and as such did not require EPA approval to begin operation. This instrument was relocated to Humboldt Hill in May 2016, to allow it to undergo a collocation study with an FRM instrument.

The Grimm 180 which was approved for a Waiver at the Humboldt Hill Monitoring Station (Attachment A) was moved to Crescent City in May 2016, to allow the Crescent City instrument to be relocated to a site near NCUAQMD headquarters to undergo a collocation study, as discussed above.

NCUAQMD requests the bimonthly flow check requirement be waived for the Grimm 180 located in Crescent City. Due to the financial burden of sending staff to Crescent City for the purpose of performing a flow check on the Grimm 180, the fact any flow check on the Grimm is by its nature incomplete (the Grimm does not indicate flow), and the fact that the Grimm data is not comparable to the NAAQS because of this lack of a flow indicator (does not meet Appendix A requirements), NCUAQMD respectfully requests to perform those flow checks on a monthly basis. Should a flow check fail, NCUAQMD would invalidate the entire data set collected after the most recent passing flow check, until flow was repaired. The monetary savings of decreasing flow check frequency outweighs the increased data security found with bimonthly flow checks.

A non-regulatory PM_{2.5} BAM1020 was deployed in Weaverville in March 2015. It is a SPM monitor, and thus did not require EPA approval to begin operation.

Review of Changes to PM_{2.5} Monitoring Network

A Waiver for the Grimm 180, serial number 18A11018, was approved in May 2016 (Attachment A) for the period of March 2013 through December 2015.

Both Grimm 180s in the network are operating as Special Purpose Instruments, and neither meet the requirements of Appendix A or an approved alternative. The Grimm 180 does not meet the EPA Minimum Data Assessment Requirements for PM_{2.5} instruments. (CFR 40, part 58, Appendix A.) It does not indicate a flow rate. Grimm is currently working on developing a flow indicator. Until a flow indicator is installed in NCUAQMD Grimm instruments, the Network's Grimm 180s will be used exclusively for AQI reporting. All data collected will be reported to AQS under code 88501 until further direction regarding this issue is received from EPA. NCUAQMD requests guidance from EPA on this issue.

NCUAQMD uses the network's Grimm PM_{2.5} FEM data for AQI comparisons only. NCUAQMD has been instructed by EPA to develop a performance assessment and improvement plan which describes how NCUAQMD will track the performance of the Grimm monitors on a quarterly basis, as well as include the activities NCUAQMD intends to take to address any continuing performance issues. This plan is attached as Attachment B: "Grimm to FRM Comparison Operational Improvement Plan". It is not anticipated that any appropriate change in the NCUAQMD GRIMM 180 SOP will make

District Grimm 180 data comparable to District FRM data. It is hypothesized data comparability could be improved by decreasing the amount of time required to collect, freeze, and analyze collocated FRM filters. However, the current resources of the NCUAQMD disallow this option unless support is provided by EPA or ARB.

The Grimm 180 which was approved for a Waiver at the Humboldt Hill Monitoring Station (Attachment A) was moved to Crescent City in May 2016, to allow the Crescent City instrument to be relocated to a site near NCUAQMD headquarters for the purpose of undergoing a collocation study. Results are expected by the time of the 2017 Annual Network Plan. Unless quarterly data evaluations show a substantial difference between the two Grimm 180s, until this study is complete both Grimms in the NCUAQMD network will be used exclusively to evaluate the AQI. Pending the investigation of FEM/FRM instrumentation and PM_{2.5} accuracy by the EPA, this may be the most effective use of the Grimm 180.

The District has not changed the location of any violating PM_{2.5} monitor. Any changes to the District's PM_{2.5} network are reviewed by EPA Region 9. The District has never eliminated an FRM PM_{2.5} sampler from the network. If a violating PM_{2.5} monitor ever needs to be moved, it is planned to use the annual network plan inspection/comment process to provide for the review of the change.

A non-regulatory PM_{2.5} BAM1020 was deployed in Weaverville in March 2015. It is a SPM monitor, and thus did not require EPA approval to begin operation. Non-FEM BAM data is not suitable for national comparison, but the data is used to report the AQI.

A Grimm 180 PM_{2.5} FEM instrument was deployed in Crescent City in April of 2016. It is an SPM monitor, and thus did not require EPA approval to begin operation.

The District owns Grimm specific auditing equipment for the Grimm 180, and conducted audits according to Grimm specifications until February 2016. In February 2016, the District started employing an Alicat flow meter and conducting flow audits on a bimonthly schedule where possible. The ARB began auditing the Grimm 180 in December of 2015.

Data Submission Requirements

Data and Precision/Accuracy reports are submitted to ARB no later than 60 days after the quarter of record. The ARB uploads District data to the National Air Quality System (AQS) no later than 90 days after the quarter of record. The ARB submits the annual data certification no later than May 1st of each year.

Data Availability

The District's air quality data is available on the AQS database. It can also be obtained directly from the District, in the form of monthly reports. Please contact the District at 707-443-3093 to request copies of these reports.

Detailed Site Information

Site Name: Jacobs

The Jacobs site was established in December of 2006. It is located on the south side of Eureka and is expected to represent neighborhood scale air quality.

Site Name	Jacobs
AQS ID	060231004
GIS coordinates	103.91015E 4514.83731N WGS84
Location	Alice Birney Elementary School
Address	717 South Ave, Eureka
County	Humboldt
Dist. to road (meters)	50
Traffic count (AADT)	3100 (2007)
Representative statistical area name	Eureka, Arcata, Fortuna
Groundcover	grass
PEP audit?	Information maintained by EPA
NPAP audit?	Information maintained by EPA
PM ₁₀ Flow audits	Performed every 2 weeks by NCUAQMD, Performed biannually by ARB
PM _{2.5} Flow audits	Performed monthly by NCUAQMD, Performed biannually by ARB
Gaseous audits	Following the requirement in QA Volume II, performance audits are performed annually by ARB
Date of 2015 annual performance evaluation for gaseous instruments (ARB audit)	May 13, 2015
Dates of two semi-annual PM10 flow audits conducted by ARB, occurring in 2015	May 13, 2015 December 2, 2015
Dates of two semi-annual PM2.5 flow audits, conducted by ARB, occurring in 2015	May 13, 2015 December 2, 2015
Gaseous One-point control checks	Performed a minimum of once every two weeks

Site Name	Jacobs					
Gaseous instrument calibrations	Performed bi-annually by ARB					
Representative Area	Humboldt County Micropolitan Statistical Area, Eureka-Arcata-Fortuna, suburban					
Pollutant	O₃	NO₂	CO	SO₂	PM_{2.5}	PM₁₀
Primary/QA Collocated/Other	N/A	Primary	N/A	N/A	Primary	Primary
Parameter Code	44201	42602	42101	42401	88101	81102
POC	1	1	1	1	1	1
Basic Monitoring Objective	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison
Site Type	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure
Monitor Type	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS	SLAMS
Spatial scale	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood	Neighborhood
Sampling method	Photometric EQOA-0880-047	Chemiluminescence RFNA-1289-074	Gas Filter correlation RFCA-0981-054	Pulsed Florescence EQSA-0486-060	Low Volume RFPS-0498-117	EQPM-0798-122
Instrument manufacturer and model	Thermo 49i	Thermo 42i	Thermo 48i	Thermo 43i	R&P 2000	Met One Bam1020
FRM/FEM/ARM	FEM	FRM	FRM	FEM	FRM	FEM
Collecting Agency	NCUAQMD	NCUAQMD	NCUAQMD	NCUAQMD	NCUAQMD	NCUAQMD
Analytical Lab	N/A	N/A	N/A	N/A	BAAQMD	N/A
Reporting Agency	ARB	ARB	ARB	ARB	ARB	ARB
Start date	Dec 15, 2006	Dec 15, 2006	Dec 15, 2006	Dec 15, 2006	Dec 25, 2006	Jan 1, 2014
Current Sampling Frequency	continuous	continuous	continuous	continuous	1:3	continuous
Sampling season	Year round	Year round	Year round	Year round	Year round	Year round
Probe height (meters)	4.5	4.5	4.5	4.5	4.3	5
Distance of low-volume PM instrument from other PM instruments are >1 meter?	NA	NA	NA	NA	Yes	NA
Distance from supporting structure (meters)	2	2	2	2	1.8	2.4
Distance from obstructions on roof	N/A	N/A	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (meters)	N/A	N/A	N/A	N/A	N/A	N/A

Site Name	Jacobs					
Pollutant	O ₃	NO ₂	CO	SO ₂	PM _{2.5}	PM ₁₀
Height of obstructions not on roof	N/A	N/A	N/A	N/A	N/A	N/A
Distance from trees (meters)	15	15	15	15	15	17
Distance to furnace or incinerator flue	N/A	N/A	N/A	N/A	N/A	N/A
Distance between collocated monitors	N/A	N/A	N/A	N/A	N/A	N/A
Unrestricted airflow (degrees)	360	360	360	360	360	360
Probe material	Teflon	Teflon	Teflon	Teflon	N/A	N/A
Residence time (seconds)	6.8	7.4	4.6	5.3	N/A	N/A
Will there be changes within the next 18 months?	No	No	No	No	No	No
Is it suitable for comparison against the annual PM _{2.5} ?	N/A	N/A	N/A	N/A	Yes	N/A

Site Name: Humboldt Hill

The Humboldt Hill site was established in June 2011. It is located on Humboldt Hill on the south side of Eureka and is expected to represent neighborhood scale air quality.

Site Name	Humboldt Hill	
AQS ID	060231005	
GIS coordinates	40.71528 (N) -124.20139 (W)	
Location	Humboldt Hill Summit	
Address	7333 Humboldt Hill Road, Eureka	
County	Humboldt	
Dist. to road	25	
Traffic count	Unknown, less than 50	
Groundcover	grass	
PEP audit?	Information maintained by EPA	
NPAP audit?	Information maintained by EPA	
PM _{2.5} Flow audits	FRM: Performed monthly by NCUAQMD, Performed biannually by ARB	FEM: Performed every two weeks
Gaseous audits	Following the requirement in QA Volume II, performance audits are performed annually by ARB	
Date of 2015 annual performance evaluation for gaseous instruments conducted by ARB.	October 22, 2015	
Dates of two semi-annual PM _{2.5} flow audits by ARB occurring in 2015	FRM method: May 13,2015 December 2, 2015	FEM Method: December 2, 2015
Gaseous One-point control checks	Performed a minimum of once per two weeks	
Gaseous Instrument Calibrations	Performed bi-annually by ARB	
Representative Area	Humboldt County Micropolitan Statistical Area, Eureka-Arcata-Fortuna, suburban	

Site Name	Humboldt Hill					
Pollutant	O ₃	NO ₂	CO	SO ₂	PM _{2.5}	PM _{2.5}
Primary/QA Collocated/ Other	N/A	Primary	N/A	N/A	Primary	Other
Parameter code	44201	42602	42101	42401	88101	88101
POC	1	1	1	1	2	1
Basic Monitoring Objective	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison	NAAQS comparison	AQI comparison
Site Type	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure	Population exposure
Monitor Type	SPM	SPM	SPM	SPM	SPM	SPM
Spatial scale	Neighbor-hood	Neighbor-hood	Neighbor-hood	Neighbor-hood	Neighbor-hood	Neighbor-hood
Sampling method	Photometric EQOA-0880-047	Chemiluminescence RFNA-1289-074	Gas Filter correlation RFCA-0981-054	Pulsed Florescence EQSA-0486-060	Low Volume RFPS-0498-117	Light scatter EQPM-0311-195
Instrument manufacturer and model	Thermo 49i	Thermo 42i	Thermo 48i	Thermo 43i	R&P 2000	Grimm 180
FRM/FEM/ ARM	FEM	FRM	FRM	FEM	FRM	FEM
Collecting Agency	NCUAQMD	NCUAQMD	NCUAQMD	NCUAQMD	NCUAQMD	NCUAQMD
Analytical Lab	N/A	N/A	N/A	N/A	BAAQMD	N/A
Reporting Agency	ARB	ARB	ARB	ARB	ARB	ARB
Start date	June 20, 2011	June 20, 2011	June 20, 2011	June 20, 2011	March 20, 2013	June 20, 2011
Current Sampling Frequency	continuous	continuous	continuous	continuous	1:3	continuous
Sampling season	Year round	Year round	Year round	Year round	Year round	Year round
Probe height (meters)	4.4	4.4	4.4	4.4	4.3	3.7
Distance of low-volume PM instrument from other PM instruments are >1 meter?	NA	NA	NA	NA	Yes	NA
Distance from supporting structure (meters)	1.9	1.9	1.9	1.9	1.8	1.2

Site Name	Humboldt Hill					
Pollutant	O ₃	NO ₂	CO	SO ₂	PM _{2.5}	PM _{2.5}
Distance from obstructions on roof	N/A	N/A	N/A	N/A	N/A	N/A
Distance from obstructions not on roof (meters)	69	69	69	69	69	69
Height of Obstruction not on roof (meters)(cell tower)	59.4	59.4	59.4	59.4	59.4	59.4
Distance from trees (meters)	93	93	93	93	93	93
Distance to furnace or incinerator flue	N/A	N/A	N/A	N/A	N/A	N/A
Distance between collocated monitors (meters)	N/A	N/A	N/A	N/A	2	2
Unrestricted airflow (degrees)	360	360	360	360	360	360
Probe material	Teflon	Teflon	Teflon	Teflon	N/A	N/A
Residence time (seconds)	6	6	5	8	N/A	N/A
Will there be changes within the next 18 months?	No	No	No	No	No	Yes
Is it suitable for comparison against the annual PM _{2.5} ?	N/A	N/A	N/A	N/A	Yes	No. waiver approved for 2015 data

Site Name: Weaverville

The Weaverville site was established in 1995. It is located in downtown Weaverville near HWY 299 and is expected to represent neighborhood air quality.

Site Name	Weaverville
AQS ID	061050002
GIS coordinates	104.95617E 4509.31330N WGS84
Location	Trinity County Courthouse
Address	11 Court Street, Weaverville
County	Trinity
Dist. to road	21 meters to highway 299
Traffic count	5,100 AADT for HWY 299
Groundcover	Paved
PEP audit	Information maintained by EPA
NPAP audit	Information maintained by EPA
PM _{2.5} Flow audits	Performed biweekly by NCUAQMD, Performed biannually by ARB
Date of annual performance evaluation (2015 ARB flow audit)	December 2, 2015
2015 semi-annual PM _{2.5} flow audits by ARB	December 2, 2015
Representative Area	Rural, no MSA in Trinity County
Pollutant	PM _{2.5}
Primary/QA Collocated/ Other	Primary
Parameter Code	88501
POC	1
Basic monitor objective	Air Pollution Data
Site Type	Population exposure
Monitor Type	SPM
Spatial scale	Neighborhood
Sampling method	731
Instrument manufacturer and model	Met One Bam1020
FRM/FEM/ARM	Non-FEM
Collecting Agency	NCUAQMD
Analytical Lab	N/A
Reporting Agency	ARB
Start date	March 2015
Current Sampling Frequency	continuous
Sampling season	Year round
Probe height (meters)	8
Distance from supporting structure (meters)	2.4

Site Name	Weaverville
Pollutant	PM_{2.5}
Distance from obstructions on roof (meters)	N/A
Distance from obstructions not on roof	N/A
Distance from trees (meters)	15
Distance to furnace or incinerator flue	N/A
Distance between collocated monitors	N/A
Unrestricted airflow (degrees)	360
Probe material	N/A
Residence time	N/A
Will there be changes within the next 18 months?	No
Is it suitable for comparison against the annual PM _{2.5} ?	No

Site Name: Crescent City

The Crescent City site was established in 1998. It is located at the Elk Crescent Middle School. It is expected to represent neighborhood scale air quality.

Site Name	Crescent City
AQS ID	060150006
GIS coordinates	41° 45' 21" N 124° 12' 13" W
Location	Elk Crescent Middle School
Address	994 G Street
County	Del Norte
Dist. to road	64 meters to 9 th Street
Traffic count	13400 AADT HWY101 CRESCENT CITY, ON L STREET AT 9TH STREET
Groundcover	Paved/grass
PEP audit	Information maintained by EPA
NPAP audit	Information maintained by EPA
Flow audit	bimonthly by NCUAQMD
Date of 2015 annual performance evaluation (ARB audit)	Not audited in 2015 (This instrument was installed April 2016)
Dates of two most recent semi-annual flow audits	Not audited in 2015 (This instrument was installed April 2016)
Representative Area	Del Norte County, Micropolitan Statistical Area, Crescent City Urban
Pollutant	PM _{2.5}
Primary/QA Collocated/Other	Other
Parameter Code	88101
POC	1
Basic Monitoring Objectives	AQI comparison
Site Type	Population exposure
Monitor Type	SPM
Spatial scale	Neighborhood
Sampling method	Light scatter EQPM-0311-195
Instrument manufacturer and model	Grimm 180
FRM/FEM/ARM	FEM
Collecting Agency	NCUAQMD
Analytical Lab	N/A
Reporting Agency	ARB
Start date	April 2016
Current Sampling Frequency	Continuous
Sampling season	Year round

Site Name	Crescent City
Pollutant	PM _{2.5}
Probe height	7
Distance from supporting structure	2
Distance from obstructions on roof	N/A
Distance from obstructions not on roof	N/A
Height of obstruction not on roof (meters)	N/A
Distance from trees	93 meters
Distance to furnace or incinerator flue	49 meters
Height of stack	4 meters
Fuel burned	diesel
Distance between collocated monitors	N/A
Unrestricted airflow(degrees)	360
Probe material	N/A
Residence time	N/A
Will there be changes within the next 18 months?	Yes
Is it suitable for comparison against the annual PM _{2.5} ?	No



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

MAY 20 2016

Brian Wilson
North Coast Unified Air Quality Management District
707 L Street
Eureka, California 95501

Dear Mr. Wilson:

In your monitoring annual network plan submitted in 2015, North Coast Unified Air Quality Management District (NCUAQMD) requested EPA's approval to consider the March 20, 2013 – November 28, 2014 PM_{2.5} data from the continuous FEM GRIMM monitor at the Humboldt Hill site (AQS ID: 06-023-1005, POC1) as not eligible for comparison to the NAAQS. Data sent via email to EPA on April 27, 2016 conveyed data for this site for March 20, 2013 – December 29, 2015. This letter is in response to your request and approves the GRIMM data collected at Humboldt Hill from March 20, 2013 – December 29, 2015 as not eligible for comparison to the NAAQS (i.e., provides a waiver for NAAQS comparability).

According to 40 CFR 58.11(e), in order to be considered not eligible for comparison to the NAAQS, continuous FEM PM_{2.5} data must be shown to not meet the criteria in 40 CFR 53 Table C-4. These criteria describe the maximum allowable multiplicative and additive bias between filter-based FRM PM_{2.5} monitor and a Class III continuous FEM PM_{2.5} monitor operating at the same site. EPA based its evaluation on the criteria in 40 CFR 53 as described by our memo dated April 20, 2013 and its attached document titled "Instructions and Template for Requesting that data from PM_{2.5} Continuous FEMs are not compared to the NAAQS."

We reviewed your request for March 20, 2013 – December 29, 2015 data. After reviewing the information in your request, we have determined that the Humboldt Hill GRIMM does not meet the bias criteria in 53 and are approved as not eligible for comparison to the NAAQS for the this time period.

Your request stated that you consider the continuous PM_{2.5} data of sufficient quality to report to the AQI, and will be submitting the data to AIRNow, so you may now re-load the data from the monitors and dates in the table above to AQS under the parameter code 88502.

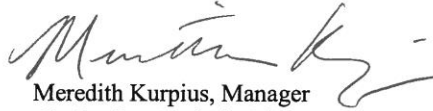
In providing the waiver for the data in the timeframes listed above, EPA expects that NCUAQMD will continue to work to improve the comparability of their continuous PM_{2.5} FEM monitors and their filter-based monitors. If NCUAQMD intends to submit data from these monitors under a parameter code other than 88101, an updated analyses of the bias for each FEM monitor should be included in future annual network plans for a renewed waiver approval.

In addition, since the intent of such a waiver is to allow more time for method and operational improvements to meet the required bias, NCUAQMD must develop a performance assessment and improvement plan to be approved by EPA that describes how the agency will track the performance of these monitors on a quarterly or more frequent basis, as well as the activities NCUAQMD intends to take to address any continuing performance issues.

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If you have any questions regarding this letter or the enclosure, please feel free to contact me at (415) 947-4534 or Gwen Yoshimura at (415) 947-4134.

Sincerely,



Meredith Kurpius, Manager
Air Quality Analysis Office
Air Division

Enclosure

cc: Wendy Caruso, NCUAQMD
Gayle Sweigert, CARB
Mike Miguel, CARB
Ken Stroud, CARB

A. EPA Evaluation of the Request for Exclusion of PM_{2.5} Continuous FEM Data

2013-2015¹

Site Name	Site ID	Cont POC	Method Description	PM _{2.5} Cont. Analysis Begin Date	PM _{2.5} Cont Analysis End Date	Continuous/ FRM Sampler pairs per season	Slope (m)	Intercept (y)	Meets bias requirement	Correlation (r)
<i>Sites with PM_{2.5} continuous FEMs that are collocated with FRMs:</i>										
Humboldt Hill	06-023-1005	1	GRIMM Model 180 (AQS method code 195)	3/20/2013	12/29/2015	Winter = 60 Spring = 59 Summer = 71 Fall = 79 Total = 269	0.87	4.15	No	0.51

¹ A technical note describing the EPA PM_{2.5} continuous monitor comparability assessment tool is located at <http://www.epa.gov/ttnamti1/files/ambient/pm25/comparabilityassessmenttool.pdf>.

Attachment B - Grimm to FRM Comparison Operational Improvement Plan

The NCUAQMD monitoring program has historically operated PM_{2.5} continuous monitors primarily to support reporting of the Air Quality Index (AQI). These monitors supply data every hour to update the national web site AIRNow (www.airnow.gov). NCUAQMD has been using these monitors as the PM_{2.5} monitoring program is implemented.

Over the last few years, a number of PM_{2.5} continuous monitors have been approved as Federal Equivalent Methods (FEMs). By utilizing an approved FEM, any subsequent data produced from the method may be eligible for comparison to EPA's health based standard known as the NAAQS. The primary advantage of operating a PM_{2.5} continuous FEM is that it can support both the AQI, while also supplying data that are eligible for comparison to the NAAQS. Thus, a network utilizing PM_{2.5} continuous FEMs can minimize the number of filter-based FRMs operated in the network, which are primarily used for comparison to the NAAQS. These filter-based FRMs are resource intensive in that they require field operations as well as pre- and post-sampling laboratory analysis which results in data not being available for approximately 8 weeks after sample collection.

Our monitoring program has been working with PM_{2.5} continuous FEMs including deployment at a few sites to evaluate their performance. Although the PM_{2.5} continuous FEMs are automated methods, these methods still require careful attention in their set-up, operation, and validation of data. Once we were able to collect enough data we began to evaluate the performance of these methods compared to a collocated FRM.. The data comparison recently completed at Humboldt Hill Station indicated that within the NCUAQMD network, Grimm 180 and Thermo 2000i FRM instruments do not produce data of sufficient correlation to allow the continuous data to be used in NAAQS comparison (correlation $r=0.51$) (EPA Evaluation of the Request for Exclusion of PM_{2.5} Continuous FEM data May 2016). It is suspected that Grimm 180 to Thermo 2000i correlation may be a systemic issue. NCUAQMD requests that information received by on EPA on other comparison studies between these instruments be shared. NCUAQMD is willing for our comparison study to be shared with any other interested parties.

Approved FRM and FEM instruments must be operated according to CFR regulations. The Grimm 180 does not meet the EPA Minimum Data Assessment Requirements for PM_{2.5} instruments. (CFR 40, part 58, Appendix A.) It does not indicate a flow rate. Grimm is currently working on developing a flow indicator. Until a flow indicator is installed in NCUAQMD Grimm instruments, the Network's Grimm 180s will be used exclusively for AQI reporting. Data will be reported to AQS under code 88501 until further direction regarding this issue is received from EPA. NCUAQMD requests guidance from EPA on this critical issue.

NCUAQMD follows all CFR and manufacturer recommendations for the operation of the Grimm 180 and the Thermo 2000i instruments. NCUAQMD is unaware of any appropriate way to improve correlation between the instruments except by imitating the EPA FEM approval testing conditions. NCUAQMD requests guidance on this issue from EPA.

FEM approval testing conditions allow for the immediate retrieval and the timely weighing of FRM filters. NCUAQMD lacks the funds and the expertise to perform the work required to run an FRM filter analysis program which is equivalent to the EPA program of FRM filter analysis during FEM Certification testing. With the assistance of EPA and ARB, NCUAQMD is interested in improving its methods and program to meet this goal. NCUAQMD requests input from EPA and ARB on this option.

NCUAQMD will track the correlation of the Grimm 180 to the Thermo 2000i FRM sampler on a quarterly basis. NCUAQMD will run the Candidate ARM Comparability Test for each quarter, and submit the results to EPA Region 9 as data becomes available, usually within 60 days of the end of the quarter. If EPA prefers a different test, please provide the template for that preferred test to NCUAQMD.

NCUAQMD looks forward to working with EPA to improve the PM_{2.5} monitoring network and continues to welcome guidance from EPA to remedy both the flow indication ability of Grimm instruments and on ways to improve correlation between the Grimm 180 and the Thermo 2000i FRM sampler.