Phillip L. Kiddoo
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GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT

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June 1, 2018

Mr. Mike Stoker
Director, Air Division USEPA Region 9
75 Hawthorne Street
Mail Stop AIR-7
San Francisco, CA 94105

Subject: Mono Basin Planning Area Reasonable Further Progress Report

Mr. Stoker,

Enclosed, please find the Reasonable Further Progress (RFP) report for the Mono Basin Planning Area. Also enclosed is Board Order #180510-07, certifying the Great Basin Unified Air Pollution Control District's Governing Board approval of the RFP.

Please note, the RFP shows that the Mono Lake water level is unlikely to meet the 1994 State Water Resources Control Board Decision 1631 management target of 6392 feet by 2020. The lake level reading on April 1, 2018 was 6381.9 feet. Additionally, the Mono Shore PM-10 monitor experienced 33 federal exceedances of the PM-10 standard in 2016, the most since it was installed in 2000.

Sincerely,

Phillip L. Kiddoo
Air Pollution Control Officer

Enclosed: 1) 2018 Mono Basin Planning Area Reasonable Further Progress Report
2) Board Order #180510-07

Cc:

U.S. Environmental Protection Agency
Elizabeth Adams
Amy Zimpfer
Ginger Vagenas

City of Los Angeles Department of Water and Power
Anselmo Collins
Nelson Mejia

California Air Resources Board
Richard Corey
Earl Withycombe

State Water Resources Control Board
Eileen Sobeck

Mono Lake Committee
Geoff McQuilkin

Phillip L. Kiddoo
Air Pollution Control Officer

Reasonable Further Progress
Mono Basin PM-10
State Implementation Plan

May 2018

Executive Summary

This document provides a Great Basin Unified Air Pollution Control District (District) progress report on air quality trends in the Mono Basin federal PM-10 nonattainment area since the adoption of the Mono Basin PM-10 State Implementation Plan in May 1995. It was preceded by similar Reasonable Further Progress Reports prepared in 2001, 2004, 2007, 2010, and 2015.

The PM-10 nonattainment problem in the Mono Basin is caused by windblown dust from the exposed lakebed of Mono Lake. Exposure of the lakebed resulted from declining lake levels due to the diversion of a large percentage of Mono Lake's tributary streams by the City of Los Angeles Department of Water and Power (City). The solution to controlling windblown dust from these exposed areas is to raise the lake level to 6,392 feet above mean sea level as set by the State Water Resources Control Board (State Water Board) Decision 1631 in 1994. At this lake level, most of the exposed lakebed areas that are causing windblown dust will be submerged. This control measure specifying an increase in the water elevation of Mono Lake by limiting the City's diversion of water from the Mono Basin was determined **the only feasible method to sufficiently reduce emissions to comply with the federal PM-10 standard**.

Despite near average runoff since the 1994 State Water Board decision, Mono Lake has not experienced the necessary lake level increases to meet the target lake level. Mono Lake reached a low elevation of 6,377 feet in January 2017. The lake level rose significantly in 2017, resulting in an April 1, 2018 reading of 6381.9 feet. However, PM-10 violations will continue if the lake level doesn't reach the 6,392-foot management level. The District encourages the State Water Board, the City, and other interested parties to work together on an updated hydrologic model well before the 2020 hearing that the State Water Board will hold if the lake has not reached 6,391 feet by that time.

Introduction and Background

The Mono Basin PM-10 planning area experiences episodes of high PM-10 concentrations due to windblown dust from the exposed bed of Mono Lake. PM-10 is an abbreviation for particulate matter less than 10 microns in average diameter. PM-10-sized particles are extremely small, less than one tenth the diameter of a human hair. Because of their small size they can penetrate deeply into the lungs causing health problems. These small airborne particles can aggravate asthma, bronchitis, heart disease and other lung diseases.

Exposure of the lakebed to wind erosion was caused by the diversion of Mono Lake's tributary streams by the City from 1941 through 1989. During this period, the City's water diversions caused Mono Lake's surface level to drop approximately 45 feet, exposing more than nine square miles of highly erodible material to wind erosion. Lakebed sediments and efflorescent salts become airborne under wind conditions producing PM-10-sized particles in extremely high concentrations. The largest dust storms occur during spring and late fall. Prior to 1995, PM-10 monitors located downwind from dust source areas at Mono Lake measured peak PM-10 concentrations of around 1,000 micrograms per cubic meter (µg/m3), which was more than six times higher than the National Ambient Air Quality Standard (federal standard) for PM-10 of 150 µg/m3 for a 24-hour average. These high air pollution levels at Mono Lake prompted the U.S. Environmental Protection Agency to designate the California portion of the Mono Lake hydrologic basin a federal PM-10 nonattainment area in 1993. It is formally referred to as the Mono Basin PM-10 Nonattainment Area.

The solution to control the windblown dust from these exposed areas is to raise the lake level to a management elevation of 6,392 feet above mean sea level, submerging or wetting most of the exposed lakebed areas that are causing windblown dust emissions. This control measure anticipated a gradual increase in the water elevation of Mono Lake, by eliminating or limiting diversion of water from the Mono Basin. This was determined the only feasible method to sufficiently reduce emissions to comply with the federal PM-10 standard as well as allow for restoration and protection of other public trust resources within the basin. The State Water Board promulgated its findings in the 1994 Mono Lake Basin Water Right Decision 1631, amending the Water Right Licenses 10191 and 10192 for the City of Los Angeles, limiting the diversion of water from the Mono Basin to achieve the goal lake level of 6,392 feet.

Clean air was only one of several public trust values considered in State Water Board Decision 1631, which was approved on September 28, 1994. Decision 1631 amended the City's water rights licenses in the Mono Basin to require specific actions to help recover the natural resources degraded by 48 years of diversions from Mono Lake's tributary streams. The decision established minimum stream flows and higher flushing flows in tributaries to protect fisheries. It also required an increase in the surface level of Mono Lake to 6,392 feet to protect aquatic and terrestrial ecosystems, enhance scenic resources, and to meet clean air standards by submerging sources of windblown PM-10 (SWRCB, 1994).

In response to the 1993 federal nonattainment designation and the State Water Board Decision 1631, a Mono Basin PM-10 State Implementation Plan (SIP) was adopted in 1995 by the District and the California Air Resources Board to comply with the requirements of the 1990 federal Clean Air Act (Patton and Ono, 1995). The SIP provided an analysis of the air quality problem and identified control measures necessary to reduce air pollution to a level that will attain the federal air quality standards. The Mono Basin SIP relies on the State Water Board Decision 1631, to provide an enforceable mechanism to reduce particulate air pollution by requiring that the level of Mono Lake be raised to 6,392 feet above mean sea level by significantly reducing the diversions from the streams controlled by the City. At this lake level most of the exposed shoreline areas that are the source of windblown dust will be wetted or submerged. Decision 1631 projected that with its export restrictions and variations in the annual hydro-climate based upon historic values the lake would fluctuate around a management elevation of 6,392 feet ("dynamic" equilibrium).

Air Quality and Lake Level

The air quality modeling analysis in the SIP predicted that the 6,392-foot lake level would likely be sufficient to bring the area into attainment with the federal PM-10 standard, since the lake would then wet or submerge much of the exposed lakebed that was causing dust storms. The time it would take to reach this management lake level would depend on yearly runoff, precipitation, and evaporation in the Mono Basin.

The SIP estimated (Figure 1) that it would take twenty-six years for Mono Lake to rise to a target elevation of 6,391 feet assuming each year experienced average hydro-climatic conditions. The hydrologic modeling was performed by the City following the State Water Board Decision 1631. Since actual conditions vary between wet and dry years, the lake level is not expected to continuously rise as projected in Figure 1. Model scenarios were completed using wet and dry hydrologic sequences to determine a range in anticipated lake level rise. Results showed that a series of extremely wet years could result in the lake reaching the target level in as little as nine years. Conversely, a prolonged series of drought years could extend the period for the lake level to reach 6,391 feet to 38 years (Figure 2).

Figure 3 provides a comparison of lake level to combined annual flow from four creeks in the Mono Basin that are subject to water diversions by the City: Rush, Lee Vining, Parker and Walker Creeks. A runoff year runs from April 1 to March 31 of the following year (e.g. runoff year 2017 is April 1, 2017 – March 31, 2018). This flow data does not include other creeks in the Mono Basin or sources of inflow such as precipitation and groundwater inflow to Mono Lake. The City reported stream flow comprises an estimated 55% percent of average annual total water inflow to the lake when the lake level is around 6,392 feet (Vorster, 1985). Long-term mean flow of the four creeks is 122,124 acre-feet per year (ac-ft/yr), based on the 50-year runoff average from 1941 to 1990. Average runoff since the State Water Board decision has been similar, averaging 122,234 ac-ft/yr between 1995 and 2017.

Decision 1631 includes two important lake levels for water diversions, 6,377.0 feet and 6,380.0 feet, that allow the City to divert up to specified amounts of water from the Mono Basin. If the level of Mono

Lake is between these two elevations on April 1, the City is permitted to export up to 4,500 ac-ft/yr from the Mono Basin. Once the lake level of 6,380.0 is exceeded, the City is allowed to divert up to 16,000 ac-ft/yr. Between 1997 and 2014, the City was allowed to export 16,000 ac-ft/yr of water from the Mono Basin under the State Water Board decision and their revised water license. Between 2015 and 2017, the lake level dropped below 6,380 feet resulting in a decrease in allowed export to 4,500 ac-ft/yr. Between July 2017 and 2018, the lake level rose above 6,380 feet, allowing the City to export 16,000 ac-ft/year.

After State Water Board's decision in 1994, the lake level rose significantly. The upper graph in Figure 3 shows that annual runoff in the Mono Basin was higher than average from 1995 through 1998. As seen in the lower graph of Figure 3, this wet period corresponded to a 9-foot increase in the lake level that peaked at 6,385.1 feet in August 1999. This dramatic increase in the lake level in the years following the State Water Board decision seemed to be an indicator that Mono Lake was well on its way to meeting the lake level target of 6,391 feet as predicted by the hydrologic models. The lake level varied only moderately until 2012 when a severe drought caused lake levels to drop sharply. The multi-year drought resulted in a drop in lake level elevation to 6,377.1 feet on January 1, 2017, the lowest since 1995. **The winter and spring of 2017 had above average precipitation and the lake level rose nearly five feet. The April 1, 2018 lake level measurement was at 6,381.9 feet.**

Averaging the annual stream flow through the series of wet and dry periods over the 23 years between 1995 through 2018 (121,234 ac-ft/yr) showed that it was very close to the 50-year mean runoff rate (122,124 ac-ft/yr) that is expected to bring the lake level up to the 6,392-foot management level for the lake. However, the expected lake level has not increased sufficiently and the lake level has fluctuated at or below 6,382 feet. Despite the average runoff from the LADWP streams, the hydroclimatic conditions over the last several decades appear different than those used to develop the model projections. Changing hydro-climatic conditions, such as potentially lower precipitation on the lake, decreased groundwater inflow and/or increased evaporation may result in a longer transition time period to reach the 6,391-foot lake level target. These model projections, water balance components, and changes in climate should be investigated by updating the Mono Basin hydrologic model developed by Vorster (1985), and the monthly forecast models developed by the State Water Board and the City. These updates will require additional data collection including precipitation around and on the Lake and potentially other hydrometeorological data to better quantify evaporation rates. The resulting updated model would be used to reevaluate the management of water resources in the basin in order to raise the lake to the 6,392-foot management level. To help with this effort the District installed a precipitation gage at the Mono Shore station in 2017 and will coordinate with stakeholders to determine whether additional hydrometeorological data would be useful in the model updating effort.

Regarding a lake level target date, Decision 1631 states, "*In the event that the water level of Mono Lake has not reached an elevation of 6,391 feet by September 28, 2014, the SWRCB will hold a hearing to consider the conditions of the lake and the surrounding areas, and will determine if any further revisions to this license are appropriate*." (SWRCB. 1994, para. 6.a.(4) of the order). However, in 2013 the Mono Lake Committee completed a Stream Restoration Agreement with the City delaying the 2014 target date to 2020. (Settlement Agreement Regarding Continuing Implementation of Water Rights Orders 98-05 and 98-07, 2013)

It is anticipated that the lake level will not reach 6,391 feet by 2020 unless the next 2 years have significantly above average precipitation. Based on the need to understand lake level fluctuations with the current climate and make updated projections, it would be beneficial to initiate a cooperative process of updating and recalibrating the hydrologic models with interested stakeholders to analyze model performance and assumed hydro-climatic sequences. The District recommends that the parties consider updating the forecast models with current and future climate projections and not just historic hydro-climatic sequences. The District encourages the stakeholders to work together to develop a forecast model that all parties can use as soon as possible and have a common basis for moving forward.

Reasonable Further Progress

An air quality modeling analysis was performed as part of the 1995 SIP to estimate PM-10 concentrations at the historic Mono Lake shoreline. This model was based on wind erosion data collected near the Simis PM-10 monitoring site. The model predicted that as the lake level rose and submerged portions of the exposed lakebed that PM-10 emissions due to windblown dust would be reduced proportionally. The air quality model predicted that a 6,391-foot lake level would bring the Mono Basin into attainment with the federal air quality standard for PM-10. Decision 1631 set a management level one foot higher at 6,392 feet in order to meet this air quality target and for long-term management of the resources in the Mono Basin.

Figure 4 shows the results of modeled design day PM-10 impacts locations in the Mono Basin. Receptor 45 (magenta line) is the receptor site with the highest modeled PM-10 concentrations. The modeled design day concentration is the 6th highest PM-10 concentration that would be expected over a 5-year period[1]. Predicted concentrations at Receptor 45 are shown for each year, based on the lake level trend for normal runoff, as shown in Figure 1. The Receptor 45 trend line for normal runoff (dashed blue line) shown in Figure 4 is the “reasonable further progress” trend expected as a result of implementation of the SIP.

In addition to the Receptor 45 normal runoff trend line, Figure 4 also includes modeled air quality trends from 1995 to 2018 at four receptor sites (Simis, Warm Springs, Mono Shore and Receptor 45), based on the actual April 1 lake level for each year. To demonstrate that the Mono Basin has made reasonable further progress to attain the federal standard, the model-predicted trend line for Receptor 45 (magenta line) in Figure 4 should be at or below the line for Receptor 45 under normal runoff conditions (dashed blue line). Based on the April 1, 2018 lake level and the model prediction, Mono Basin is not currently meeting the reasonable further progress trend. This is primarily due to the lake level in 2018 being about nine feet below the expected lake level to demonstrate reasonable further progress.

The accuracy of the air quality model predictions in Figure 4 can be evaluated by comparing the model prediction for the design concentration at Mono Shore to the actual monitor value at that site. The 6th highest monitored PM-10 concentration at Mono Shore from 2013 through 2017 was 3,284 µg/m3. This

[1] Compliance with the federal PM-10 standard allows no more than 1 exceedance of the 24-hour Standard per year, thus if the 6th highest monitor value over a 5-year period is less than 150 µg/m3 then the site would be considered to be in compliance.

is approximately ten times higher than the expected concentration predicted by the air quality model. This indicates that the model is under-predicting concentrations near the Mono Shore site indicating that PM-10 emissions near Mono Shore may have been significantly under-estimated in the model.

The District has taken steps to improve the air quality modeling analysis in the Mono Shore area by utilizing measurement and modeling techniques that have been applied successfully to model windblown dust at Owens Lake, CA. In 2005, the District installed additional monitoring equipment at the Mono Shore site to measure wind erosion using sand flux monitors and hourly PM-10 concentrations. In 2017, the wind erosion monitoring network was reconfigured to improve the ability to correlate wind erosion to PM-10. The results from this improved model will help the District to re-evaluate the relationship between PM-10 concentrations and the lake level near the Mono Shore site.

Ambient PM-10 Monitor Concentrations

The District has operated PM-10 monitors in the Mono Basin since 1988. These sites are shown in Figure 5, which includes a graphical representation of source areas for wind-blown dust. Monitor site locations included Lee Vining, Simis, Warm Springs and Mono Shore. Warm Springs was shut down in 1993 due to operational difficulties at this remote site. The Simis site was shut down in 2008 after recording no exceedances of the federal Standard for 12 years, with a maximum concentration between 1991 and 1996 of 120 µg/m3. Lee Vining and Mono Shore are still operating. See Attachment A.

The Mono Shore PM-10 monitor site was installed to monitor concentrations at a location expected to have the highest windblown dust levels in the Mono Basin. A worst-case PM-10 site was needed to verify in the future whether the area was in attainment with the federal standard. From January 2000 through December 2017, 272 violations of the federal PM-10 standard (>150 µg/m3) were monitored at the Mono Shore site, or about 15 violations per year). The 24-hour average concentrations on 82 of these violation days exceeded 1,000 µg/m3, with the highest concentration being 14,147 µg/m3. See Attachment B.

Future Challenges

Mono Lake failed to reach an elevation of 6,391 feet by September 28, 2014, when the State Water Board was originally to hold a hearing to consider the conditions of the lake and determine whether any further revisions to the LADWP's licenses would be appropriate. Even with postponement of the hearing for six more years, Mono Lake will likely fail to reach an elevation of 6,391 feet. Given the determination that the only current feasible method to sufficiently reduce emissions to comply with the federal PM-10 standard consists of increasing the lake level water elevation at Mono Lake, more restrictive measures may need to be implemented. However, balancing the competing demands for water resources, resource protection throughout the Mono Basin, and the requirements of federal, state and local air quality laws, enacting further amendments restricting water exports may prove to be challenging and controversial.

Conclusion

Dust storms continue to occur and federal PM-10 violations continue to be measured in the Mono Basin PM-10 nonattainment area. Since it began operation in January 2000, the Mono Shore monitor on the north shore of Mono Lake has recorded 272 violations of the federal PM-10 Standard, or about 15 per year.

Over the last 23 years, runoff has been close to the long-term average runoff value for the Mono Basin, while City's stream diversions were close to 16,000 acre-feet per year. During the same time period the lake level has fluctuated at or below 6,382 feet and has not experienced the necessary lake level increases to meet the management level target of 6,392 feet. PM-10 violations will continue if the lake doesn't reach the 6,392-foot target. The District encourages the State Water Board, the City, and other interested parties to cooperatively update the hydrologic model and lake level projections well before the 2020 State Water Board hearing.

References

MLC, 2018. Mono Lake Committee, *Mono Lake Levels 1979 to Present*, http://www.monobasinresearch.org/data/levelmonthly.php, Accessed May 2018.

Patton, Christopher and Duane Ono, 1995, *Mono Basin Planning Area PM-10 State Implementation Plan – Final*. Great Basin Unified Air Pollution Control District, Bishop, California, May 1995.

SWRCB, 1994. State of California Water Resources Control Board, *Mono Lake Basin Water Right Decision 1631*. Sacramento, California, September 28, 1994.

SWRCB, 2013. Settlement Agreement Regarding Continuing Implementation of Water Rights Orders 98-05 AND 98-07, https://www.waterboards.ca.gov/waterrights/water_issues/programs/mono_lake/docs/mb_sttlmntagrmnt_signed.pdf, Accessed May 2018.

Vorster, 1985. *A Water Balance Forecast Model for Mono Lake*, California Earth Resources Monograph No. 10 USDA, United States Forest Service Region 5.

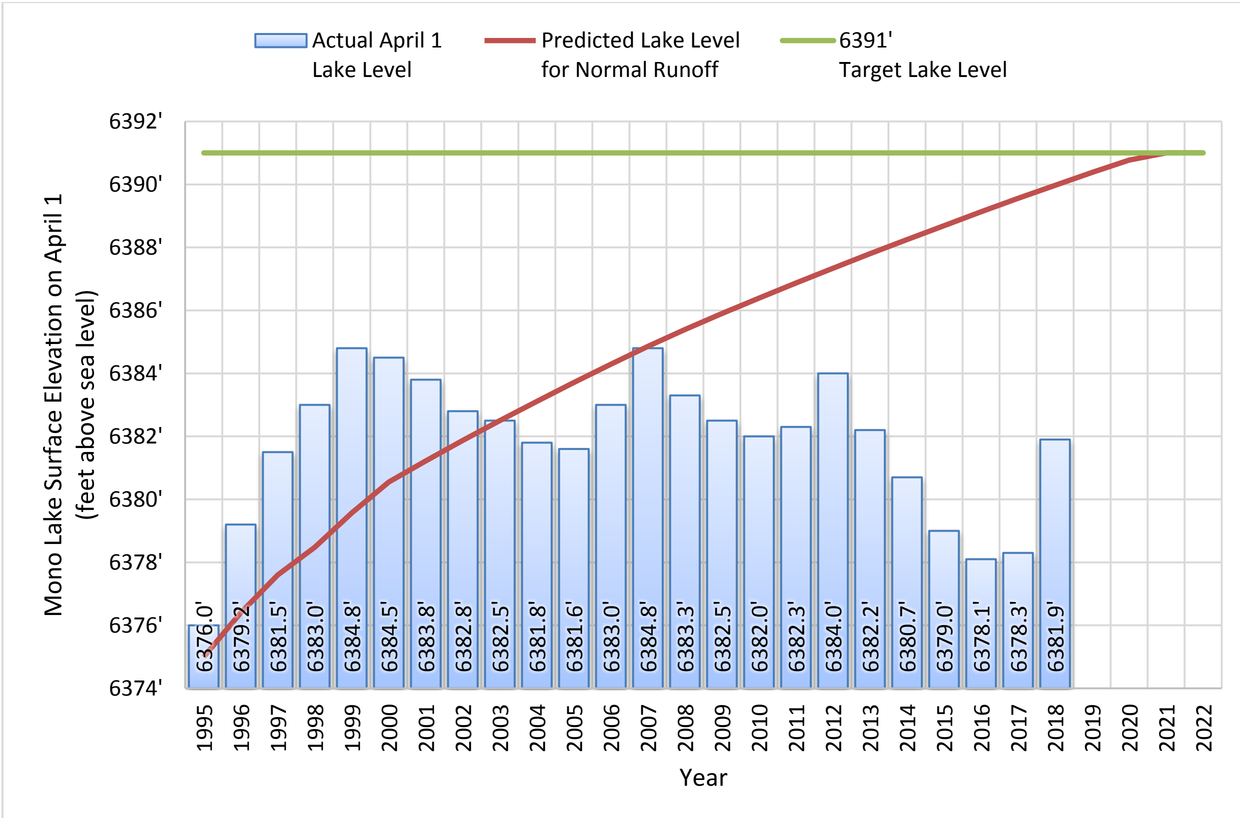


Figure 1. Mono Lake's surface elevation as measured on April 1, 2018 was 8 feet below the lake level predicted by the City's hydrologic model, which assumes the same average runoff, precipitation, and evaporation and 16,000 acre-feet of exports in each year. Preliminary analysis suggests that when the prediction is adjusted for actual runoff and precipitation, the current lake level is close to the predicted value.

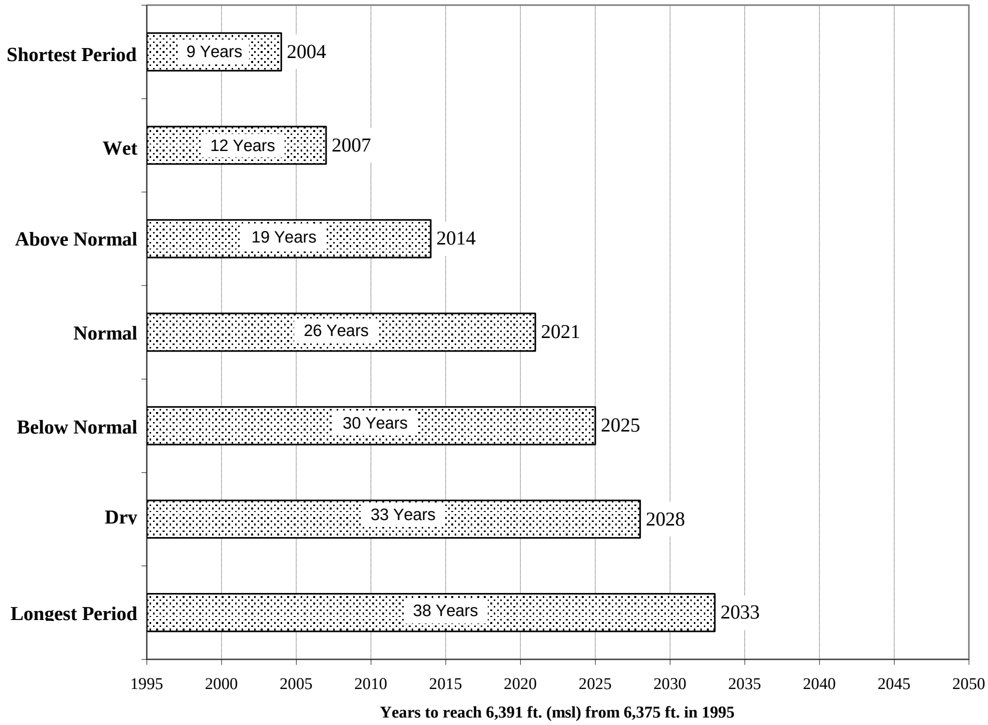
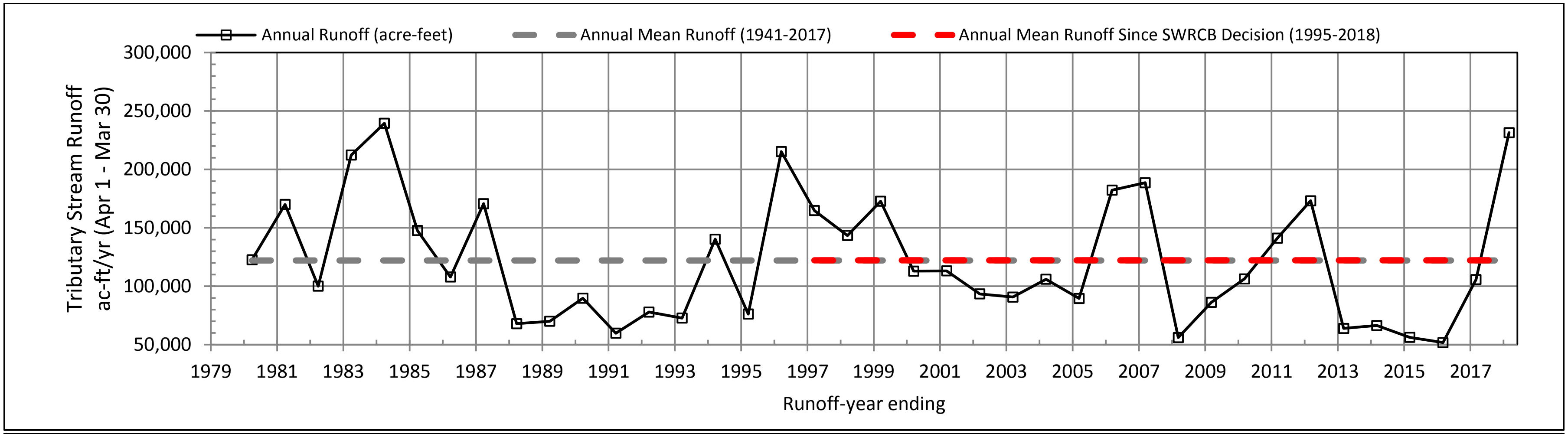


Figure 2. The City of Los Angeles Department of Water and Power's hydrologic model in 1995 predicted that under the same average hydroclimate conditions it would take 26 years for the lake level to reach 6,391 feet using the D-1631 Operational Rules for water management. Depending on the sequence of wet and dry years, the target level of 6391 feet could be achieved in little as 9 years or in as much as 38 years.

Agenda Item No. 7 - Attachment 1



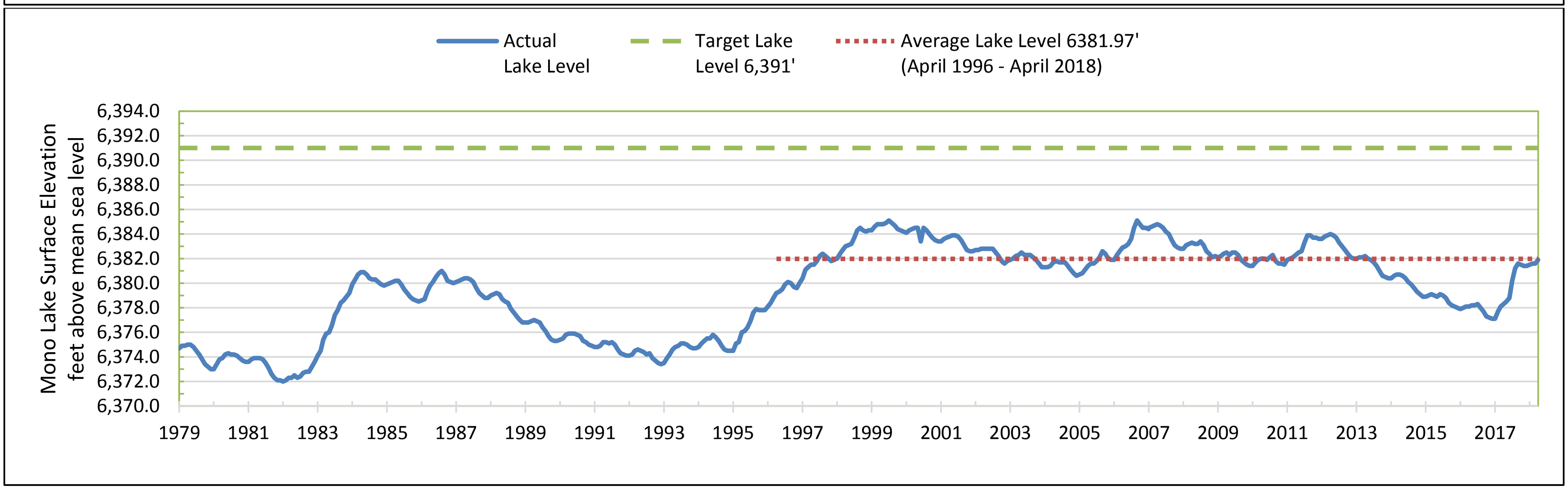


Figure 3. The upper graph shows that average runoff to Mono Lake from April 1996 through March 2018 was close to the long-term average runoff value used in the hydrologic models, an index representing 55% of the inflow to the Basin. During the same period Mono Lake's surface elevation averaged 6,381.79 feet. As seen in the lower graph, increases and decreases in lake level appeared to correspond to years when runoff was above or below average runoff, respectively. Further investigation is required to determine whether the lake level will continue fluctuating around 6,382 feet under the current hydro-climatic conditions.

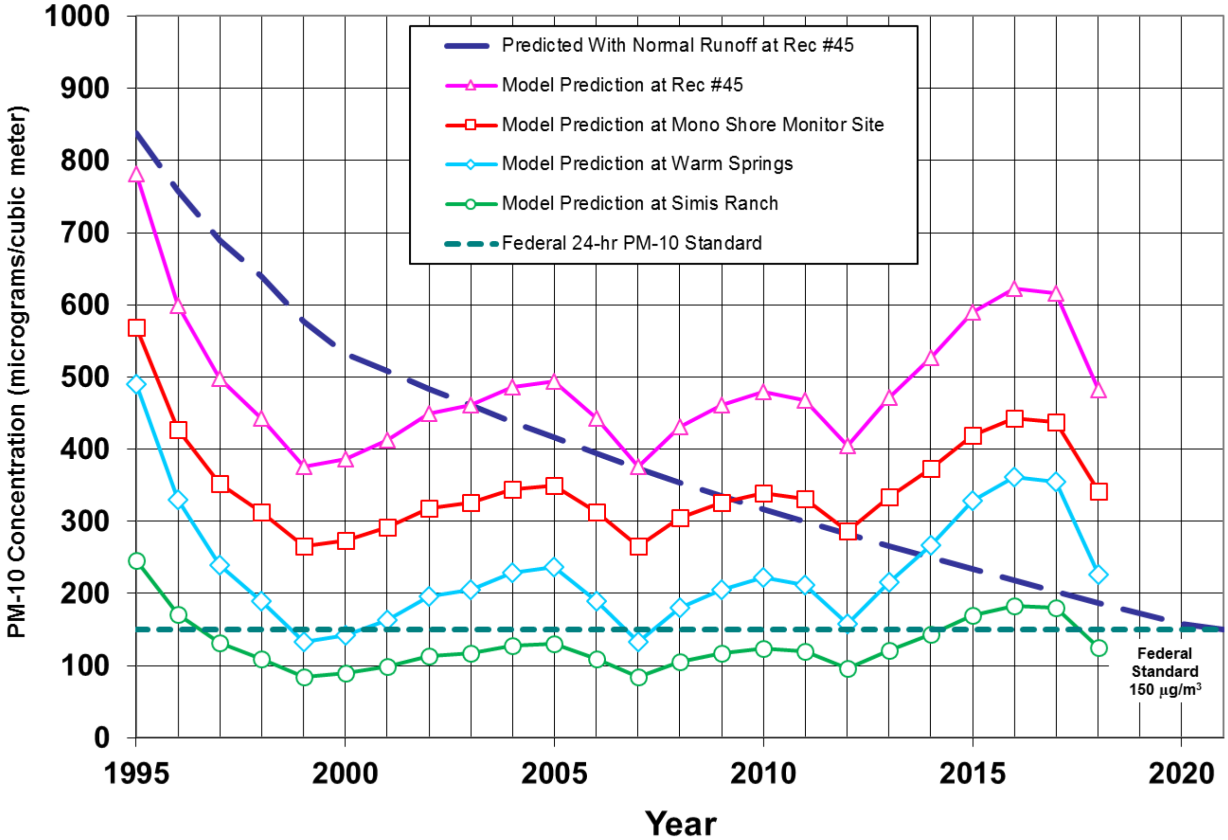


Figure 4. Modeled PM-10 impacts at Mono Lake sites compared to the reasonable further progress trend at Receptor 45 for average runoff. A comparison of monitored values at Mono Shore to the model predicted PM-10 value shows that the 2018 monitored design day concentration was about 10 times higher than predicted by the model. The District is collecting data to improve the air quality model.

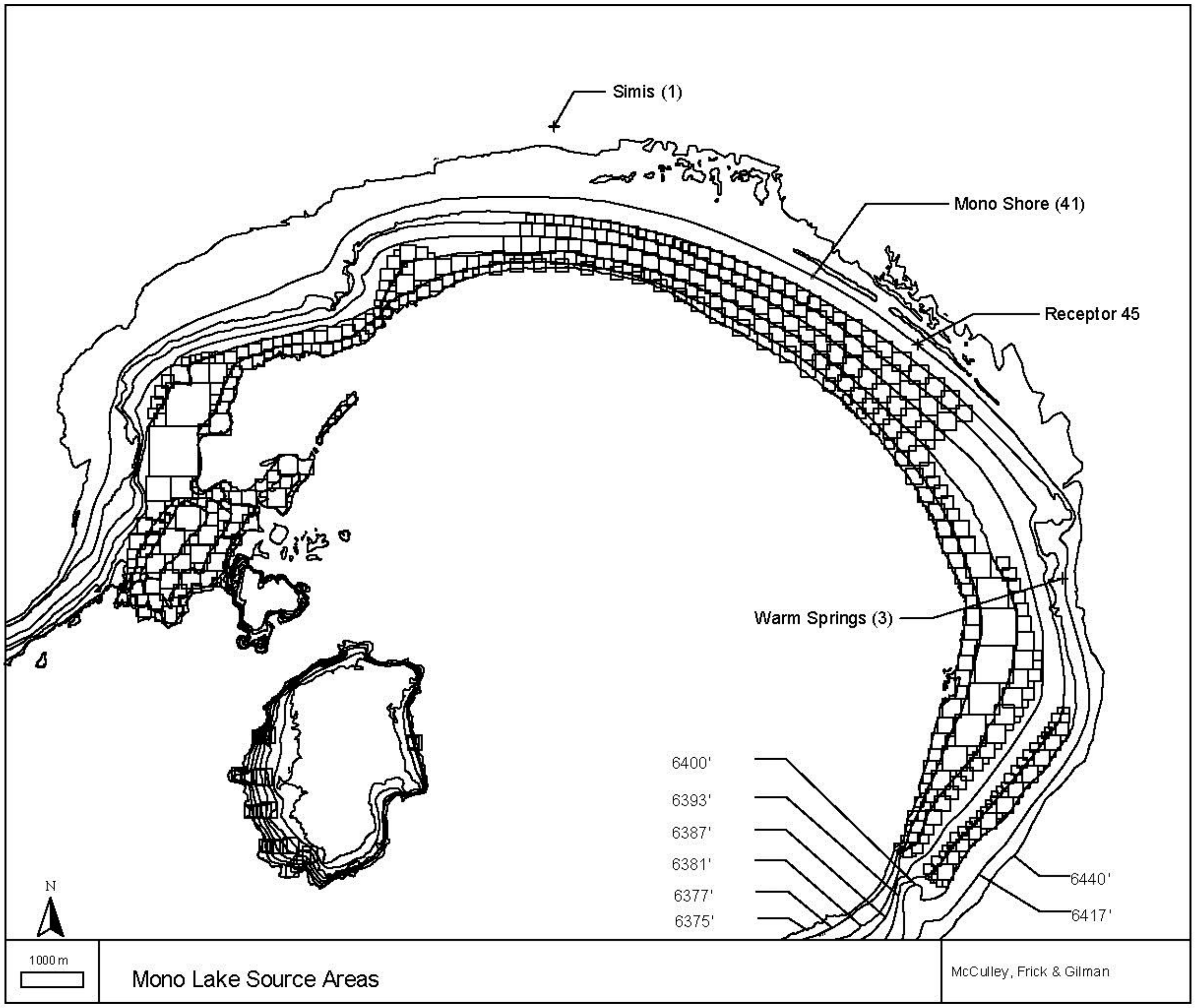


Figure 5. Mono Lake dust source areas and the locations of Receptor 45 and the monitoring sites at Simis, Mono Shore and Warm Springs.

ATTACHMENT A

PM-10 SITES IN MONO BASIN

AND NUMBER OF MONITORED VIOLATIONS

Mono Basin PM-10 Monitor Violation Summary				
Year	**Monitor Site**	**Number of Violations**	**Number of Sample Days**	**Sample Method**
1986	Simis	0	16	a
1987	Simis	0	45	a
1988	Simis	0	81	a
1988	Lee Vining	0	51	b
1989	Simis	0	132	a
1989	Lee Vining	0	60	b
1990	Warm Springs	0	2	a
1990	Simis	0	168	a
1990	Lee Vining	0	62	b
1991	Warm Springs	1	7	a
1991	Simis	0	85	a
1991	Lee Vining	0	58	b
1992	Warm Springs	1	9	a
1992	Simis	2	77	a
1992	Lee Vining	0	59	b
1993	Simis	2	42	a
1993	Lee Vining	0	31	b
1994	Simis	0	27	a
1994	Lee Vining	0	56	b
1995	Simis	0	41	a
1995	Lee Vining	0	51	b
1996	Simis	1	56	a
1996	Lee Vining	0	60	b
1997	Simis	0	60	a
1997	Lee Vining	0	61	a,b
1998	Warm Springs	0	4	a
1998	Simis	0	66	a
1998	Lee Vining	0	47	a
1999	Simis	0	98	a
1999	Lee Vining	0	106	a

a-Andersen, b-Wedding, c-BGI, d-Partisol, e-TEOM

ATTACHMENT A - CONTINUED

PM-10 SITES IN MONO BASIN

AND NUMBER OF MONITORED VIOLATIONS

Mono Basin PM-10 Monitor Violation Summary				
Year	**Monitor Site**	**Number of Violations**	**Number of Sample Days**	**Sample Method**
2000	Mono Shore	9	272	c
2000	Simis	0	92	a
2000	Lee Vining	0	113	a
2001	Mono Shore	2	221	c
2001	Simis	0	104	a
2001	Lee Vining	0	110	a,d
2002	Mono Shore	8	276	c
2002	Simis	0	79	c
2002	Lee Vining	1	100	d
2003	Mono Shore	9	212	c
2003	Simis	0	70	c
2003	Lee Vining	0	107	d
2004	Mono Shore	11	166	c
2004	Simis	0	48	c
2004	Lee Vining	0	102	d
2005	Mono Shore	14	189	c
2005	Simis	0	73	c
2005	Lee Vining	0	90	d
2006	Mono Shore	16	167	c
2006	Simis	0	67	c
2006	Lee Vining	0	121	d
2007	Mono Shore	15	238	c
2007	Simis	0	99	c
2007	Lee Vining	0	109	d
2008	Mono Shore	14	245	c,e
2008	Simis	0	55	c
2008	Lee Vining	0	116	d
2009	Mono Shore	16	365	e
2009	Lee Vining	0	115	d
2010	Mono Shore	22	362	e
2010	Lee Vining	0	23	d

a-Andersen, b-Wedding, c-BGI, d-Partisol, e-TEOM

ATTACHMENT A - CONTINUED

PM-10 SITES IN MONO BASIN

AND NUMBER OF MONITORED VIOLATIONS

Mono Basin PM-10 Monitor Violation Summary				
Year	**Monitor Site**	**Number of Violations**	**Number of Sample Days**	**Sample Method**
2011	Mono Shore	18	362	e
2011	Lee Vining	0	113	d
2012	Mono Shore	25	366	e
2012	Lee Vining	0	110	d
2013	Mono Shore	9	365	e
2013	Lee Vining	1	100	d
2014	Mono Shore	12	363	e
2014	Lee Vining	0	115	d
2015*	Mono Shore	19	289	e
2015	Lee Vining	0	119	d
2016	Mono Shore	33	350	e
2016	Lee Vining	0	121	d
2017	Mono Shore	24	365	e
2017	Lee Vining	0	119	d

a-Andersen, b-Wedding, c-BGI, d-Partisol, e-TEOM. In Summer 2015 a lightning strike took out the Mono Shore TEOM between August 1, 2015 and October 15, 2015.

ATTACHMENT B – Monitored PM-10 Violation Days at Mono Shore Site

2000 – 9 PM-10 Violations (µg/m³)	
April 8, 2000	690
May 4, 2000	1063
May 6, 2000	490
May 9, 2000	3059
May 10, 2000	1513
June 7, 2000	1642
June 8, 2000	241
October 9, 2000	387
November 29, 2000	10466
2001 – 2 PM-10 Violations (µg/m³)	
June 2, 2001	414
September 25, 2001	4482
2002 – 8 PM-10 Violations (µg/m³)	
February 28, 2002	195
March 10, 2002	396
April 14, 2002	3089
April 15, 2002	1157
May 18, 2002	201
May 19, 2002	6505
May 20, 2002	1481
November 7, 2002	1744
2003 – 9 PM-10 Violations (µg/m³)	
March 13, 2003	487
March 14, 2003	1657
March 26, 2003	333
April 13, 2003	1170
April 21, 2003	545
April 24, 2003	5283
April 25, 2003	5745
April 26, 2003	341
April 27, 2003	398
2004 – 10 PM-10 Violations (µg/m³)	
May 11, 2004	192
May 12, 2004	843
May 17, 2004	913
June 7, 2004	447
September 18, 2004	987
October 8, 2004	430
October 17, 2004	322
October 18, 2004	898

October 19, 2004	871
October 26, 2004	208
2005 – 14 PM-10 Violations (µg/m³)	
April 7, 2005	285
April 13, 2005	386
May 28, 2005	2108
June 6, 2005	507
June 17, 2005	235
June 18, 2005	292
June 19, 2005	328
June 20, 2005	298
June 21, 2005	541
September 10, 2005	546
September 11, 2005	487
October 1, 2005	940
October 2, 2005	1245
October 13, 2005	477
2006 – 16 PM-10 Violations (µg/m³)	
May 19, 2006	1915
May 20, 2006	238
May 21, 2006	174
June 12, 2006	450
June 13, 2006	168
June 27, 2006	210
September 14, 2006	1012
September 15, 2006	306
November 8, 2006	624
November 10, 2006	434
November 21, 2006	231
November 22, 2006	174
November 28, 2006	1764
December 8, 2006	300
December 23, 2006	721
December 26, 2006	4300
2007 – 14 PM-10 Violations (µg/m³)	
January 10, 2007	1909
January 11, 2007	359
April 6, 2007	168
April 14, 2007	2008
April 17, 2007	726
September 30, 2007	2154

ATTACHMENT B – Monitored PM-10 Violation Days at Mono Shore Site

October 4, 2007	1657
October 10, 2007	10020
October 16, 2007	266
October 19, 2007	1347
October 20, 2007	304
November 27, 2007	1336
November 29, 2007	480
November 30, 2007	2736
2008 – 14 PM-10 Violations (µg/m³)	
April 6, 2008	247
April 11, 2008	930
April 30, 2008	2769
May 7, 2008	161
May 20, 2008	2563
June 4, 2008	694
June 5, 2008	913
June 21, 2008	906
August 31, 2008	857
September 19, 2008	286
October 30, 2008	309
October 31, 2008	330
November 3, 2008	409
December 13, 2008	470
2009 – 16 PM-10 Violations (µg/m³)	
March 3, 2009	489
March 9, 2009	625
March 29, 2009	477
April 14, 2009	1130
May 1, 2009	158
May 3, 2009	766
May 4, 2009	1377
September 29, 2009	235
October 3, 2009	335
October 13, 2009	717
October 19, 2009	363
November 11, 2009	343
November 12, 2009	248
November 20, 2009	14147
December 6, 2009	1461
December 7, 2009	181
2010 – 22 PM-10 Violations (µg/m³)	
March 25, 2010	339
March 29, 2010	159
March 30, 2010	495
April 2, 2010	754
April 3, 2010	740
April 4, 2010	444
April 11, 2010	794
April 20, 2010	181
April 27, 2010	4344
May 9, 2010	305
May 10, 2010	307
May 21, 2010	3096
May 25, 2010	1529
May 26, 2010	318
May 27, 2010	460
June 16, 2010	318
August 28, 2010	210
September 7, 2010	357
September 8, 2010	210
October 24, 2010	735
November 19, 2010	807
December 14, 2010	1112
2011 – 18 PM-10 Violations (µg/m³)	
February 15, 2011	654
February 16, 2011	253
March 10, 2011	916
March 15, 2011	477
April 20, 2011	1375
April 28, 2011	212
May 25, 2011	4886
May 28, 2011	1213
May 30, 2011	216
May 31, 2011	1802
June 1, 2011	633
June 28, 2011	834
October 3, 2011	477
November 3, 2011	1994
November 18, 2011	3393
November 30, 2011	242
December 1, 2011	343
December 30, 2011	649
2012 – 24 PM-10 Violations (µg/m³)	
January 15, 2012	1488

ATTACHMENT B – Monitored PM-10 Violation Days at Mono Shore Site

January 19, 2012	1482
January 20, 2012	268
February 29, 2012	340
March 1, 2012	476
March 6, 2012	563
March 12, 2012	677
March 13, 2012	315
March 31, 2012	1409
April 12, 2012	203
April 23, 2012	533
April 26, 2012	1385
May 14, 2012	1385
May 17, 2012	270
May 24, 2012	227
June 1, 2012	158
June 4, 2012	1265
June 23, 2012	220
June 25, 2012	630
October 22, 2012	209
November 8, 2012	3972
November 28, 2012	289
November 29, 2012	2187
December 21, 2012	598
2013 – 9 PM-10 Violations (µg/m³)	
March 5, 2013	174
April 7, 2013	3284
April 14, 2013	435
April 15, 2013	529
June 18, 2013	187
June 19, 2013	213
August 20, 2013	170
September 21, 2013	295
October 27, 2013	1870
2014 – 12 PM-10 Violations (µg/m³)	
March 29, 2014	626
April 17, 2014	258
May 18, 2014	2618
September 25, 2014	340
October 15, 2014	173
October 25, 2014	908
October 31, 2014	268
November 22, 2014	1188

November 28, 2014	1890
December 10, 2014	390
December 11, 2014	1405
December 29, 2014	402
2015 – 19 PM-10 Violations (µg/m³)	
February 5, 2015	1071
February 6, 2015	3294
March 31, 2015	239
April 1, 2015	1048
April 4, 2015	287
April 5, 2015	4098
April 7, 2015	405
April 13, 2015	513
April 14, 2015	1836
May 12, 2015	243
May 13, 2015	288
November 15, 2015	469
November 24, 2015	882
December 3, 2015	586
December 6, 2015	2072
December 9, 2015	445
December 10, 2015	713
December 13, 2015	259
December 22, 2015	299
2016 – 33 PM-10 Violations (µg/m³)	
January 13, 2016	852
January 29, 2016	811
March 10, 2016	162
March 11, 2016	280
March 13, 2016	2106
March 14, 2016	899
March 20, 2016	898
March 21, 2016	1233
March 28, 2016	855
April 14, 2016	345
April 22, 2016	234
May 19, 2016	4054
May 20, 2016	1184
June 15, 2016	2160
October 2, 2016	272
October 13, 2016	541
October 14, 2016	2138

ATTACHMENT B – Monitored PM-10 Violation Days at Mono Shore Site

October 15, 2016	6507
October 16, 2016	264
October 23, 2016	503
October 24, 2016	816
October 30, 2016	454
November 15, 2016	334
November 16, 2016	1878
November 18, 2016	219
November 19, 2016	3103
November 20, 2016	615
November 25, 2016	1176
November 26, 2016	719
December 6, 2016	694
December 10, 2016	267
December 14, 2016	988
December 15, 2016	2288
2017 – 24 PM-10 Violations (μg/m³)	
January 1, 2017	384
January 2, 2017	753
January 3, 2017	2081
February 16, 2017	751

February 26, 2017	953
March 4, 2017	1400
March 5, 2017	842
March 20, 2017	172
March 24, 2017	798
March 30, 2017	382
April 6, 2017	3543
April 11, 2017	291
April 12, 2017	521
April 16, 2017	563
April 26, 2017	505
April 27, 2017	213
May 12, 2017	402
September 20, 2017	1349
October 19, 2017	659
October 20, 2017	1236
November 8, 2017	407
November 9, 2017	2538
November 13, 2017	216
December 20, 2017	192