Iowa
State Implementation Plan Revision
For PM_{10}
in
Buffalo, Iowa

IOWA DNR™

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Executive Summary

In accordance with the federal Clean Air Act (CAA), the Iowa Department of Natural Resources (DNR) prepared this document for submittal to the U.S. Environmental Protection Agency (EPA) as a revision to Iowa's State Implementation Plan (SIP or plan). The purpose of this SIP revision is to provide for continued attainment of the 24-hour PM_{10} National Ambient Air Quality Standards (NAAQS) in the Buffalo, Iowa, area.

This plan updates the PM_{10} control measures for Linwood Mining & Minerals Corporation (Linwood) by replacing their outdated 1998 Administrative Consent Order (ACO 98-AQ-07) with forty-one source-specific air construction permits issued by the DNR. The legally enforceable permits contain emission limits and other conditions necessary to maintain ambient PM_{10} concentrations at levels protective of the 24-hour NAAQS, as demonstrated by a comprehensive dispersion modeling analysis.

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1. Introduction

On October 1, 1998, the Iowa Department of Natural Resources (DNR) submitted a State Implementation Plan (SIP or plan) revision to the U.S. Environmental Protection Agency (EPA) to reduce ambient concentrations of particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10}) in the Buffalo, Iowa, area. That plan included two Administrative Consent Orders (ACOs), one for Linwood Mining & Minerals Corporation (Linwood) and one for Lafarge Corporation (now Continental Cement), the major PM_{10} sources in the area. Each ACO contained facility-specific control measures to meet the PM_{10} national ambient air quality standards (NAAQS). EPA fully approved the SIP revision, and thus Linwood's ACO (98-AQ-07)[1] and Lafarge's ACO (98-AQ-08), on March 18, 1999 (64 FR 13343).

1.1. PM_{10} NAAQS

Solid and liquid particles within the PM_{10} size fraction can harm lung tissue by causing scarring and decreased lung function. These particles can also cause eye and throat irritation and premature death. To protect public health as required by the Clean Air Act (CAA), EPA establishes standards, called primary NAAQS, which quantify the maximum amount of pollution allowed in ambient air. To protect public welfare from any known or anticipated adverse effects of a pollutant (such as effects on soils, water, crops, vegetation, materials, and visibility), EPA establishes secondary NAAQS.

The State of Iowa ambient air quality standards are the national primary and secondary NAAQS as published in 40 Code of Federal Regulations (CFR) Part 50, as adopted by reference into the Iowa Administrative Code (IAC) at 567 IAC 22.11. Pursuant to 40 CFR 50.6, the level of the current primary PM_{10} NAAQS is 150 micrograms per cubic meter (µg/m^3), based on a 24-hour average concentration. The standard is attained when the 3-year average of the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one, as determined in accordance with Appendix K to 40 CFR 50. The PM_{10} secondary NAAQS is equal to the primary standard in all respects. In 2006, EPA revoked the 50 µg/m^3 annual PM_{10} standard (71 FR 61144, October 17, 2006). Due to that revocation, no further consideration is given to the annual PM_{10} NAAQS in this document.

1.2. Buffalo Area Overview and PM_{10} Sources

Buffalo, Iowa, is a town in southwestern Scott County with a July 1, 2025, population estimate of 1,146 people (U.S. Census Bureau, Vintage 2025 data). As indicated in Figure 1-1**,** Buffalo is located southwest of the city of Davenport along Highway 22, near the northern shore of the Mississippi River, which flows east-west in this location. The area's topography is largely defined by the Mississippi River and the river valley. The city's elevation along Highway 22 (near the river) is approximately 170 meters, but extends above 200 meters in the upland portions of town. Rolling hills are otherwise common features. A series of quarries lie east of Buffalo.

The Buffalo ambient air monitoring site (ID 19-163-0017) is located at 11100 110th Avenue, Davenport, Iowa 52804. DNR established the site in April 1989 for SO_2 monitoring purposes and added PM_{10} monitoring in April 1992. Figure 1-2 depicts the site's location, and the locations of Linwood and Continental Cement.

Linwood (DNR facility ID 82-01-015) operates a limestone mining and lime manufacturing plant located at 401 East Front Street, Davenport, Iowa, 52804.[2] Processing activities involve extracting stone from the underground mine, transporting and crushing the stone, and screening and sizing the output. Materials are then either stockpiled or transported to other parts of the plant for further processing. Final products include limestone for construction, agricultural, and chemical uses; lime (calcium oxide) for chemical and metallurgical uses; and fine-ground calcium carbonate ($CaCO_3$) for industrial and commercial uses. Lime is produced using rotary kilns located in the portion of the plant south of Highway 22 (the "river" side of the plant). The underground mining operation and related quarrying activities are situated north of the highway (the "bluff" side of the plant).

Continental Cement (facility ID 82-04-005), formerly Lafarge Corporation, is located at 301 East Front Street, Buffalo, Iowa, 52728. Continental Cement is a Portland cement manufacturing facility. The facility's limestone quarrying operations are located north of Highway 22 in an open-pit mine. The kiln and associated Portland cement production equipment are located in the portion of the plant south of Highway 22.

[1] The ACO is numbered 98-AQ-7 but is generally cited as 98-AQ-07 (the leading zero is presumed).

[2] Linwood owns the mining operations while Carmeuse Mining Co. owns the lime production assets and leases them to Linwood.

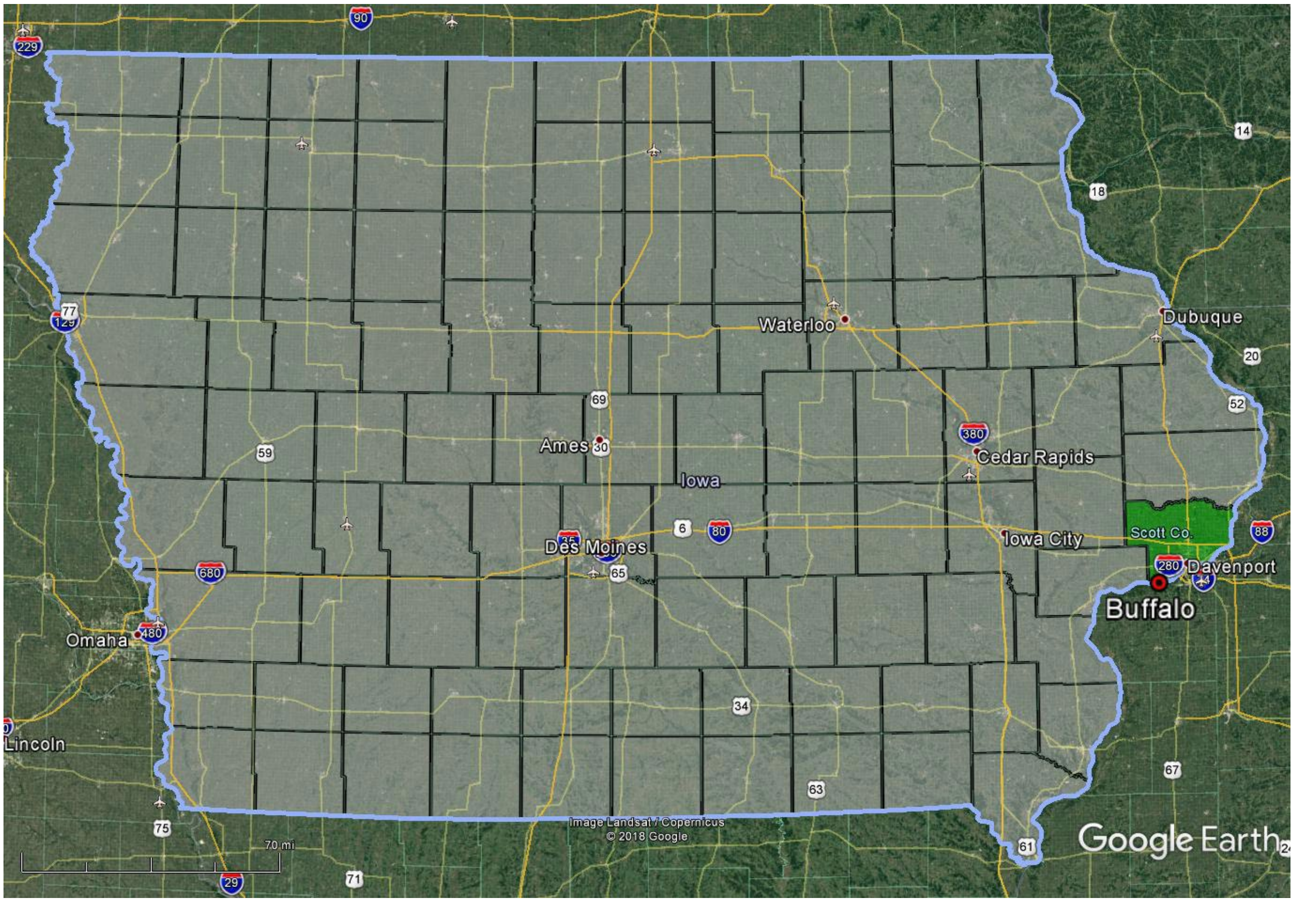

Figure 1-1. State map highlighting the eastern Iowa locations of Scott County and the city of Buffalo.

Figure 1-2. Locations of the Buffalo ambient PM_{10} monitoring site, Linwood, and Continental Cement.

1.3. Buffalo PM_{10} SIP History

In 1994, the Buffalo ambient monitoring site measured its first exceedance of the 24-hour PM_{10} standard. That individual exceedance was sufficient to foretell that a PM_{10} NAAQS violation was inevitable.[3] In 1995, the DNR began development of a strategy to limit ambient PM_{10} concentrations in the Buffalo area to ensure that the NAAQS would be attained and maintained as soon as possible. By working proactively, the State also hoped to avoid a nonattainment designation for the area.

EPA chose to allow the State to work with Linwood and Continental Cement to establish NAAQS compliance, and the area did avoid a PM_{10} nonattainment designation. DNR collaborated with the facilities on control strategy development, signing ACOs in 1998 that legally established each facility's control measure obligations. Linwood's control measures included a haul-road fugitive dust control program, paving a plant exit road, redesigning traffic patterns, restricting storage pile sizes and locations, modifying dust collectors to meet new PM_{10} emission limits, increasing stack heights, and converting horizontal discharges to unobstructed vertical releases. Continental Cement's control measures also included a haul-road fugitive dust plan and new PM_{10} emission limits for dust collectors, as well as monthly throughput limits on numerous sources.

DNR signed Linwood's ACO (98-AQ-07) on February 13, 1998, and incorporated that document and its exhibits into Appendix D of the Buffalo PM_{10} SIP.[4] Appendix C contained Continental Cement's ACO (98-AQ-08), signed by the DNR on March 19, 1998. Both ACOs still remain federally enforceable, as approved into 40 CFR 52 Subpart Q through EPA's March 18, 1999 (64 FR 13343) direct final rule. EPA received no comments on the concurrently published proposal.

On March 4, 2002, the DNR and Linwood entered into a new ACO, 2002-AQ-10, which superseded and replaced ACO 98-AQ-07 (now referred to here as Linwood's original ACO). However, ACO 2002-AQ-10 was not submitted to EPA for inclusion in the SIP. Furthermore, the newer ACO (2002-AQ-10) is no longer needed because DNR has regularly updated Linwood's control measures to account for requested facility changes, as supported by dispersion modeling and enforced through DNR's source-specific air quality construction permits. DNR rescinded Linwood's latest ACO (2002-AQ-10) on April 19, 2019, but did not request that EPA remove the original ACO from the SIP, nor did DNR request that EPA include in the SIP any subsequent air construction permits that replaced the previous ACOs.

1.4. Purpose of this SIP Revision

The purpose of this plan revision is to update Linwood's SIP-approved control measures to reflect current requirements by removing the outdated ACO (98-AQ-07) from the SIP and replacing it with forty-one air construction permits (listed in Chapter 5 and included in Attachment A). These steps will fully address the prior inactions.

DNR's air construction permits are legally enforceable documents containing source-specific emission limits, operating conditions, compliance testing obligations, and monitoring, reporting, and record keeping requirements as necessary to satisfy applicable state and federal regulations. The included construction permits maintain the plan's core objective of continuing to provide for attainment of the 24-hour PM_{10} NAAQS in the Buffalo area, as demonstrated in the dispersion modeling analysis reviewed in Chapter 6, while establishing more stringent requirements, such as additional control measures, compliance demonstrations, and record keeping and monitoring, as discussed in Chapter 5.

DNR is not requesting SIP revisions for Continental Cement at this time because modification of their ACO (98-AQ-08) is currently unnecessary. Continental Cement continues to operate the emissions sources regulated by that ACO in accordance with its legally enforceable terms. Those terms include material throughput limits on processes (such as storge piles, conveyors, and crushers), a fugitive dust plan to control emissions from the plant's paved and unpaved haul roads, and record keeping requirements. Continental Cement certified in its most recent *Title V Operating Permit Annual Compliance Certification Form*, dated March 10, 2026, that the facility complied with the requirements of the ACO.

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[3] Although determining NAAQS compliance using an official 24-hour PM_{10} design value (DV) generally requires three years of ambient monitoring data, in certain situations (Section 2.2 provides an example) it is possible to know that a single exceedance will later yield a DV that does not meet the standard, regardless of the other data collected within the full three-year period.

[4] DNR may also reference that plan as the "original Buffalo PM_{10} SIP." While the terms "plan" and "SIP" are generally interchangeable, any plan submitted after mid-1972 is technically a "SIP revision" because EPA approved the initial SIPs for all 50 states on May 31, 1972 (37 FR 10842); however, the "revision" term is often omitted for simplicity.

2. 24-Hour PM_{10} Exceedance and Design Value Descriptions

Although the level of the 24-hour PM_{10} NAAQS is 150 µg/m^3, a monitoring site doesn't register an exceedance unless the measured daily average PM_{10} concentration is 155 µg/m^3 or greater.[5] EPA intentionally imposed that condition by defining an exceedance (in 40 CFR 50 Appendix K) as "a daily value that is above the level of the 24-hour standard after rounding to the nearest 10 µg/m^3 (*i.e.*, values ending in 5 or greater are to be rounded up)."

The actual magnitude of the exceedance concentration is otherwise not considered because compliance with the 24-hour PM_{10} NAAQS is determined based on an average exceedance count, and not an average concentration. Attainment requires that the 3-year average of the annual number of expected exceedances for a site be equal to or less than 1.0, as calculated in accordance with Appendix K. A given 3-year average exceedance count for a site is commonly called its 24-hour PM_{10} exceedance-based design value (DV). For convenience and brevity, this document omits the "exceedance-based" wording and refers to that value simply as a 24-hour PM_{10} DV.

2.1. Exceedance Count Adjustments

In the simplest case, a 24-hour PM_{10} DV could be determined by counting the number of exceedances that occurred in a consecutive 3-year period and dividing that number by 3. However, this would require a perfect dataset, meaning it contains valid[6] samples for every day in each of the three years. If a site's scheduled sampling frequency is less than daily (*e.g.*, 1-in-3 or 1-in-6 days), or samples are missed, the observed exceedance counts must be adjusted upward (per Appendix K) to account for the possible effect of incomplete data. Adjustments must be made on a quarterly basis and are calculated by multiplying the quarter's actual exceedance count by the ratio of its calendar days to the number of valid daily samples in the quarter, and rounding the result to the nearest hundredth.

If a quarter's actual measured exceedance count is zero, the resulting expected exceedance count will always be 0.00, regardless of the scheduled sampling frequency. As a more informative example, assume that during a particular calendar quarter, 39 out of a possible 92 samples were recorded, with one observed exceedance of the 24-hour PM_{10} standard. The resulting estimated number of exceedances for that quarter would then be: (1 x (92/39)) = 2.36.

2.2. 24-Hour PM_{10} Design Value

Calculating an ambient monitoring site's 24-hour PM_{10} DV generally requires twelve quarterly expected exceedance counts from a consecutive 3-year period. For each year, the four quarterly values are summed, and then rounded to the nearest tenth, to produce a total annual expected exceedance count. Averaging the three annual totals, and rounding that to the nearest tenth, generates the site's 24-hour PM_{10} DV. A design value of 1.1 or greater fails the attainment test.

As an example, if a given year's four quarterly expected exceedance counts are: 2.36 (borrowed from the previous section), 2.30, 0.00, and 0.00, then the total annual expected exceedance count is (2.36 + 2.30 + 0.00 + 0.00) = 4.7.

Next, assuming that no exceedances were observed in the following two years, then the site's 24-hour PM_{10} DV is simply: (4.7 + 0.0 + 0.0) / 3 = 1.6. This monitoring site would thus fail the attainment test for the 24-hour PM_{10} NAAQS.

While a typical 24-hour PM_{10} DV uses three years of data, it is not difficult to show that a single exceedance can yield an impending NAAQS violation. For example, assume that a site is using a 1-in-6 day sampling schedule and that it measures 1 exceedance out of 15 valid samples in quarter 2 (Q2) in its first year of operation. Because Q2 in any year always contains 91 calendar days, the Q2 expected exceedance count for this scenario is (1 x (91/15)) = 6.07. Further assuming that the other three quarters were free of exceedances, then that year's total annual expected exceedance count would be (0.00 + 6.07 + 0.00 + 0.00) = 6.1. Even if no exceedances occur in the second or third years, the site's 24-hour PM_{10} DV could be no less than (6.1 + 0.0 + 0.0)/3 = 2.0, meaning that the site will fail the attainment test, from a single exceedance. This hypothetical scenario is actually similar (but not identical) to the early conditions observed at the Buffalo site, as discussed in the next chapter.

[5] Since daily measured concentrations might include one decimal digit, it may be more precise to say that the smallest concentration that registers as an exceedance is 155.0 µg/m^3. But even if available, the decimal digit is often truncated (and not used for rounding).
[6] Data validity is determined against completeness criteria and specific quality assurance/quality control requirements, but the details of those topics are predominantly outside the scope of this document.

3. Buffalo PM_{10} Ambient Data Review

DNR began measuring ambient PM_{10} concentrations at the Buffalo site (ID 19-163-0017) on April 12, 1992. However, the 1992 data is appropriately excluded here because it is a partial-year record with no exceedances, and it would not meet the data completeness criteria in 40 CFR 50 Appendix K.[7] This analysis thus uses 1993-2024 data.[8]

For each year in the 1993-2024 timeframe, Table 3-1 provides the top three maximum 24-hour average PM_{10} concentrations, the scheduled sampling frequency, the expected annual exceedance count, and the 24-hour PM_{10} DV. Table 3-2 details the quarterly expected exceedance counts and exceedance dates. These tables include data from the primary instrument (POC 1 or 2)[9] only, consistent with its intended purpose of assessing NAAQS compliance.

Table 3-1. Buffalo (site ID 19-163-0017) 24-hour average PM_{10} ambient data overview ("^{X}" indicates an exceedance).

Year	1st Max (µg/m³)	2nd Max (µg/m³)	3rd Max (µg/m³)	Scheduled Sampling Frequency	Expected Exceedance Count	3-Year Period for the DV	24-Hour PM_{10} DV	Meets NAAQS? (<= 1.0)
1993	119	106	92	1 in 6 Days	0	n/a		n/a
1994	**229^x**	146	124	1 in 6 Days	6.1	n/a		[Will Fail]
1995	**162^x**	**156^x**	140	Varied*	9.4**	1993–1995	5.2**	No
1996	**202^x**	152	149	Daily	1.0	1994–1996	5.5	No
1997	144	143	139	Daily	0	1995–1997	3.5	No
1998	129	120	118	Daily	0	1996–1998	0.3	Yes
1999	**182^x**	**176^x**	143	Daily	2.0	1997–1999	0.7	Yes
2000	**192^x**	120	109	Daily	1.1	1998–2000	1.0	Yes
2001	146	145	114	Daily	0	1999–2001	1.0	Yes
2002	**169^x**	142	134	Daily	1.0	2000–2002	0.7	Yes
2003	144	137	134	Daily	0	2001–2003	0.3	Yes
2004	**170^x**	133	131	Daily	1.0	2002–2004	0.7	Yes
2005	**164^x**	151	150	Daily	1.0	2003–2005	0.7	Yes
2006	**161^x**	122	119	Daily	1.0	2004–2006	1.0	Yes
2007	113	107	106	Daily	0	2005–2007	0.7	Yes
2008	116	101	99	Daily	0	2006–2008	0.3	Yes
2009	119	116	107	Daily	0	2007–2009	0	Yes
2010	132	129	126	Daily	0	2008–2010	0	Yes
2011	149	134	124	Daily	0	2009–2011	0	Yes
2012	141	137	129	Daily	0	2010–2012	0	Yes
2013	141	130	124	Daily	0	2011–2013	0	Yes
2014	145	132	117	Daily	0	2012–2014	0	Yes
2015	153	114	111	Daily	0	2013–2015	0	Yes
2016	120	110	107	Daily	0	2014–2016	0	Yes
2017	110	105	104	Daily	0	2015–2017	0	Yes
2018	123	117	117	Daily	0	2016–2018	0	Yes
2019	127	113	105	Daily	0	2017–2019	0	Yes
2020	154	127	113	Daily	0	2018–2020	0	Yes
2021	115	93	88	Daily	0	2019–2021	0	Yes
2022	131	103	102	Daily	0	2020–2022	0	Yes
2023	**160^x**	104	96	Daily	1.1	2021–2023	0.4	Yes
2024	89	72	71	Daily	0	2022–2024	0.4	Yes

*In mid-September 1995, the scheduled sampling frequency increased from a 1-in-6 day to a 1-in-3 day schedule. In essence, this means Q1-Q3 1995 operated on a 1-in-6 day schedule while Q4 used a 1-in-3 day schedule. (Daily sampling began on Dec. 29, 1995.)
**Note, these values do not match those listed in the original Buffalo PM_{10} SIP. The discrepancies are discussed in Section 3.1.

[7] Generally, 75% of the data in every quarter must be complete (but less stringent criteria apply for showing a site fails to attain).
[8] The 2025 data were preliminary at the time of evaluation and thus omitted. While now certified, no exceedances occurred in 2025.
[9] The parameter occurrence code (POC) distinguishes between multiple monitors measuring the same parameter (pollutant) at the same site. The primary PM_{10} instrument at the Buffalo site changed from a continuous monitor (POC 1) to a gravimetric (filter-based) monitor (POC 2) beginning in 2005. Section 3.2 discusses newer continuous PM_{10} instruments currently in use at the site.

Table 3-2. Buffalo (site ID 19-163-0017) quarterly exceedance data review.

Year	Quarter	Observed Exceedances	Total Days in Quarter	Sample Days in Quarter	Expected Exceedances	Exceedance Date(s)	Concentration (μg/m³)
1993	Q1	0	90	15	0		
1993	Q2	0	91	13	0		
1993	Q3	0	92	12	0		
1993	Q4	0	92	14	0		
1993	**Total**	**0**	**365**	**54**	**0**		
1994	Q1	0	90	15	0		
1994	Q2	1	91	15	6.07	Apr 26, 1994	229
1994	Q3	0	92	16	0		
1994	Q4	0	92	15	0		
1994	**Total**	**1**	**365**	**61**	**6.1**		
1995	Q1	0	90	15	0		
1995	Q2	0	91	15	0		
1995	Q3	1	92	17	5.41	Aug 25, 1995	162
1995	Q4	1	92	23*	4.00*	Oct 15, 1995	156
1995	**Total**	**2**	**365**	**70***	**9.4***		
1996	Q1	0	91	88	0		
1996	Q2	0	91	90	0		
1996	Q3	0	92	91	0		
1996	Q4	1	92	90	1.02	Nov 16, 1996	202
1996	**Total**	**1**	**366**	**359**	**1.0**		
1997	Q1	0	90	90	0		
1997	Q2	0	91	91	0		
1997	Q3	0	92	86	0		
1997	Q4	0	92	92	0		
1997	**Total**	**0**	**365**	**359**	**0**		
1998	Q1	0	90	90	0		
1998	Q2	0	91	89	0		
1998	Q3	0	92	91	0		
1998	Q4	0	92	83	0		
1998	**Total**	**0**	**365**	**353**	**0**		
1999	Q1	0	90	86	0		
1999	Q2	2	91	89	2.04	May 3 & 4, 1999	182; 176
1999	Q3	0	92	92	0		
1999	Q4	0	92	92	0		
1999	**Total**	**2**	**365**	**359**	**2.0**		
2000	Q1	0	91	81	0		
2000	Q2	1	91	82	1.11	Apr 5, 2000	192
2000	Q3	0	92	88	0		
2000	Q4	0	92	89	0		
2000	**Total**	**1**	**366**	**340**	**1.1**		
2001	Q1	0	90	90	0		
2001	Q2	0	91	91	0		
2001	Q3	0	92	92	0		
2001	Q4	0	92	92	0		
2001	**Total**	**0**	**365**	**365**	**0**		
2002	Q1	1	90	89	1.01	Mar 24, 2002	169
2002	Q2	0	91	91	0		
2002	Q3	0	92	91	0		
2002	Q4	0	92	92	0		
2002	**Total**	**1**	**365**	**363**	**1.0**		
2003	Q1	0	90	90	0		
2003	Q2	0	91	91	0		
2003	Q3	0	92	92	0		
2003	Q4	0	92	90	0		

Year	Quarter	Observed Exceedances	Total Days in Quarter	Sample Days in Quarter	Expected Exceedances	Exceedance Date(s)	Concentration (µg/m³)
2003	**Total**	**0**	**365**	**363**	**0**		
2004	Q1	0	91	91	0		
2004	Q2	0	91	91	0		
2004	Q3	1	92	91	1.01	Sep 20, 2004	170
2004	Q4	0	92	92	0		
2004	**Total**	**1**	**366**	**365**	**1.0**		
2005	Q1	0	90	90	0		
2005	Q2	0	91	91	0		
2005	Q3	1	92	92	1.00	Aug 2, 2005	164
2005	Q4	0	92	92	0		
2005	**Total**	**1**	**365**	**365**	**1.0**		
2006	Q1	0	90	90	0		
2006	Q2	0	91	91	0		
2006	Q3	1	92	92	1.00	Sep 16, 2006	161
2006	Q4	0	92	92	0		
2006	**Total**	**1**	**365**	**365**	**1.0**		
2007	Q1	0	90	88	0		
2007	Q2	0	91	91	0		
2007	Q3	0	92	92	0		
2007	Q4	0	92	92	0		
2007	**Total**	**0**	**365**	**363**	**0**		
2008	Q1	0	91	91	0		
2008	Q2	0	91	90	0		
2008	Q3	0	92	91	0		
2008	Q4	0	92	92	0		
2008	**Total**	**0**	**366**	**364**	**0**		
2009	Q1	0	90	90	0		
2009	Q2	0	91	91	0		
2009	Q3	0	92	92	0		
2009	Q4	0	92	92	0		
2009	**Total**	**0**	**365**	**365**	**0**		
2010	Q1	0	90	90	0		
2010	Q2	0	91	91	0		
2010	Q3	0	92	92	0		
2010	Q4	0	92	92	0		
2010	**Total**	**0**	**365**	**365**	**0**		
2011	Q1	0	90	90	0		
2011	Q2	0	91	91	0		
2011	Q3	0	92	92	0		
2011	Q4	0	92	92	0		
2011	**Total**	**0**	**365**	**365**	**0**		
2012	Q1	0	91	91	0		
2012	Q2	0	91	91	0		
2012	Q3	0	92	92	0		
2012	Q4	0	92	92	0		
2012	**Total**	**0**	**366**	**366**	**0**		
2013	Q1	0	90	89	0		
2013	Q2	0	91	84	0		
2013	Q3	0	92	86	0		
2013	Q4	0	92	92	0		
2013	**Total**	**0**	**365**	**351**	**0**		
2014	Q1	0	90	87	0		
2014	Q2	0	91	84	0		
2014	Q3	0	92	80	0		
2014	Q4	0	92	85	0		

Year	Quarter	Observed Exceedances	Total Days in Quarter	Sample Days in Quarter	Expected Exceedances	Exceedance Date(s)	Concentration (µg/m³)
2014	**Total**	**0**	**365**	**336**	**0**		
2015	Q1	0	90	75	0		
2015	Q2	0	91	81	0		
2015	Q3	0	92	91	0		
2015	Q4	0	92	83	0		
2015	**Total**	**0**	**365**	**330**	**0**		
2016	Q1	0	91	87	0		
2016	Q2	0	91	90	0		
2016	Q3	0	92	83	0		
2016	Q4	0	92	91	0		
2016	**Total**	**0**	**366**	**351**	**0**		
2017	Q1	0	90	89	0		
2017	Q2	0	91	87	0		
2017	Q3	0	92	81	0		
2017	Q4	0	92	91	0		
2017	**Total**	**0**	**365**	**348**	**0**		
2018	Q1	0	90	73	0		
2018	Q2	0	91	85	0		
2018	Q3	0	92	89	0		
2018	Q4	0	92	92	0		
2018	**Total**	**0**	**365**	**339**	**0**		
2019	Q1	0	90	88	0		
2019	Q2	0	91	89	0		
2019	Q3	0	92	92	0		
2019	Q4	0	92	63	0		
2019	**Total**	**0**	**365**	**332**	**0**		
2020	Q1	0	91	82	0		
2020	Q2	0	91	90	0		
2020	Q3	0	92	80	0		
2020	Q4	0	92	86	0		
2020	**Total**	**0**	**366**	**338**	**0**		
2021	Q1	0	90	90	0		
2021	Q2	0	91	88	0		
2021	Q3	0	92	92	0		
2021	Q4	0	92	92	0		
2021	**Total**	**0**	**365**	**362**	**0**		
2022	Q1	0	90	90	0		
2022	Q2	0	91	90	0		
2022	Q3	0	92	92	0		
2022	Q4	0	92	84	0		
2022	**Total**	**0**	**365**	**356**	**0**		
2023	Q1	0	90	88	0		
2023	Q2	1	91	82	1.11	Jun 28, 2023	160**
2023	Q3	0	92	91	0		
2023	Q4	0	92	89	0		
2023	**Total**	**1**	**365**	**350**	**1.1**		
2024	Q1	0	91	82	0		
2024	Q2	0	91	91	0		
2024	Q3	0	92	92	0		
2024	Q4	0	92	90	0		
2024	**Total**	**0**	**366**	**355**	**0**		

*Note, these values do not match those listed in the original Buffalo PM_{10} SIP. The discrepancies are discussed in Section 3.1.
**This exceedance was likely influenced, if not caused, by smoke impacts from Canadian wildfires.

From 1993 to 2024, DNR measured twelve exceedances of the 24-hour PM_{10} NAAQS at the Buffalo site. None were observed during the initial full year of operation (1993), and no single year yielded more than two exceedances. The first reported exceedance occurred in Q2 (April 26) 1994 and measured 229 µg/m^3.[10] It yielded a quarterly expected exceedance count of 6.07 (given the site's then 1-in-6 day sampling schedule) and an expected annual exceedance count of 6.1, as indicated in Table 3-2. Those values alone foretold a pending NAAQS violation, but two additional exceedances followed in 1995, one in Q3 (August 25) and one in Q4 (October 15), measuring 162 and 156 µg/m^3, respectively.

The quarterly and annual total expected exceedance counts for 1995, as calculated based on the number of daily samples recorded in EPA's Air Quality System (AQS),[11] were: 0.00 + 0.00 + 5.41 + 4.00 = 9.4.[12] The site's first available 24-hour PM_{10} DV (1993-1995) was thus (0.0 + 6.1 + 9.4)/3 = 5.2, which does not meet the NAAQS. While that DV and the Q4 1995 expected exceedance count do not exactly match the values in the original (1998) Buffalo PM_{10} SIP, the differences have no regulatory significance, as examined in section 3.1.

The 1994-1996 and 1995-1997 24-hour PM_{10} DVs also continued to violate the NAAQS, but Figure 3-1 indicates that the Buffalo site's yearly maximum PM_{10} concentrations have generally trended downward since 1994. No exceedances were measured in 1997 or 1998, and all 24-hour PM_{10} DVs since the 1996-1998 3-year period have attained the standard.

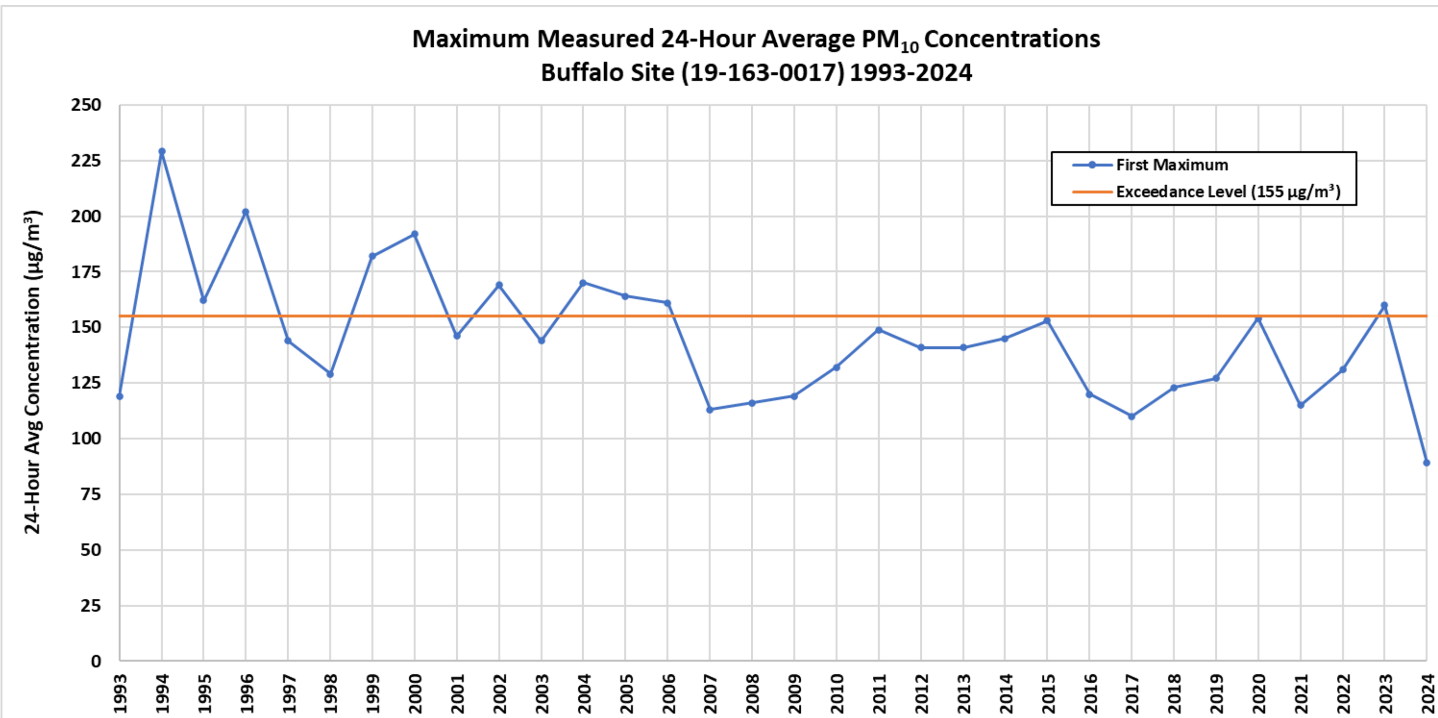

Figure 3-1. Buffalo site yearly maximum (1st highest) observed 24-hour average PM_{10} concentrations, 1993-2024.

The last year that contained two measured exceedances was 1999, and beginning in 2007, nearly all exceedance counts are zero. The one exception is a June 28, 2023, exceedance (160 µg/m^3) that was likely influenced, if not caused, by Canadian wildfire smoke. However, investigation of that exceedance as a possible exceptional event is currently unwarranted because it has no regulatory significance pursuant to 40 CFR 50.14(a)(1)(i) (*e.g.*, it doesn't result in a NAAQS violation) and thus wouldn't qualify for review under the Exceptional Events rule (81 FR 68216, October 3, 2016).

[10] The measured concentrations provided in this document were truncated to an integer (if a decimal digit was present).

[11] AQS is the national repository managed by EPA that stores ambient data collected and uploaded by air pollution control agencies. While AQS access is restricted, EPA provides alternative means for the public to obtain AQS data.

[12] DNR increased the scheduled sampling frequency from a 1-in-6 to a 1-in-3 schedule in Q4 1995, which largely explains why the Q3 expected exceedance count (5.41) is larger than in Q4 (4.00). Beginning in 1996, the expected exceedance counts are typically identical to the actual exceedance counts, due to the implementation of a daily sampling schedule. Where scheduled samples are missed or invalid in that timeframe, the calculation of the expected number of quarterly exceedances may increment the actual quarterly exceedance count by a small amount, at most from 1.00 to 1.11 (*e.g.*, see Q2 2000 in Table 3-2).

3.1. 1995 Sample Count

The original Buffalo PM_{10} SIP indicates that Q4 1995 contained thirty measured samples, whereas current records, as stored in AQS and presented here, include sample results for only twenty-three days. The origin and values of the seven additional samples are unknown, but their existence is possible given the increase in the site's scheduled sampling frequency from 1-in-6 days to 1-in-3 days in Q4 1995.

Even though the details are missing, none of the seven samples in question could be an exceedance as the original SIP identifies only one exceedance occurring in Q4 1995, an October 15th exceedance that measured 156 $\mu g/m^3$, and that matches the DNR's data in AQS. All other actual exceedance counts, dates, and exceedance measurements throughout the period of overlap, 1993-1995, also agree. Fortunately, the sample count inconsistency has no regulatory effect. It leads only to inconsequential numerical differences in the downstream Q4 and 1995 total expected exceedance counts, and in the 1993-1995 DV, as shown below.

According to the original Buffalo PM_{10} SIP:

- The Q4 1995 expected exceedance count was (1 exceedance x (92 calendar days / 30 sample days)) = 3.1;
- The 1995 total expected exceedance count was (0 + 0 + 5.4 + 3.1) = 8.5; and,
- The 1993-1995 24-hour PM_{10} DV was (0 + 6.1 + 8.5)/3 = 4.8.

According to the information in AQS and this document:

- The Q4 1995 expected exceedance count is (1 exceedance x (92 calendar days / 23 sample days)) = 4.00;
- The 1995 total expected exceedance count is (0.00 + 0.00 + 5.41 + 4.00) = 9.4; and,
- The 1993-1995 24-hour PM_{10} DV is (0.0 + 6.1 + 9.4)/3 = 5.2.

Either design value (4.8 or 5.2) violates the 24-hour PM_{10} NAAQS and necessitates the development and implementation of control measures. Since the original SIP did not include ambient data beyond 1995, the discrepancies end there, but would have carried through to the 1995-1997 design value. That too is unimportant because any design value that includes an annual exceedance count of either 8.5 or 9.4 will violate the NAAQS.[13] After the 1995-1997 3-year period, the discrepancies become irrelevant because the 1995 data no longer factors into the DV calculations.

3.2. Continuous Data

Beginning in 2013, DNR added two PM_{10} beta attenuation monitors (BAMs) to the Buffalo site, one for air quality index (AQI) reporting (POC 3) and one for quality assurance (POC 5) purposes. Since neither BAM is intended to assess NAAQS compliance, and for simplicity, this document excludes all BAM data, even to augment (fill) the site data record if the primary sample is missing or invalid. To the extent that Appendix K prescribes data augmenting procedures to produce a "combined site data record" for DV calculation purposes, applying those methods could yield expected exceedance counts and DVs for 2013 and later that differ slightly versus the values presented above. However, this possible discontinuity currently has minimal numerical impact and no regulatory importance because neither PM_{10} BAM measured an exceedance on any day without a valid sample from the primary instrument, and any adjustments in the expected exceedance count calculations (and resulting DVs) would be inconsequential, as shown in the next paragraphs.

Since the beginning of 2013 (the start date of the PM_{10} BAMs), the primary monitor has recorded only one exceedance of the 24-hour PM_{10} NAAQS. The exceedance measured 160 $\mu g/m^3$ and occurred on June 28, 2023. Of the 91 calendar days in Q2 2023, the primary instrument produced 82 valid samples. The expected exceedance count for that quarter was thus (1 x (91/82)) = 1.11, and the annual count was (0.00 + 1.11 + 0.00 + 0.00) = 1.1. For the 2021-2023 period, the resulting DV was (0.0 + 1.1 + 0.0)/3 = 0.4.

If the 9 absent samples were augmented (filled) using BAM[14] data, the expected number of exceedances in Q2 2023 would be (1 x (91/91)) =1.00 and the annual count would be (0.00 + 1.00 + 0.00 + 0.00) = 1.0. The resulting 2021-2023 DV would then be (0.0 + 1.0 + 0.0)/3 = 0.3, which is a slight decrease from 0.4, but not a meaningful difference.

[13] Both would always fail to meet the 24-hour PM_{10} NAAQS because the lowest DV they could achieve in a three-year period is either: (8.5 + 0.0 + 0.0)/3 = 2.8 or (9.4 + 0.0 + 0.0)/3 = 3.1.

[14] Neither BAM measured an exceedance on any of those nine days.

4. Linwood's PM_{10} Emissions Inventory

Linwood's annual actual PM_{10} emissions, in tons per year (tpy), are shown in Figure 4-1 for the 1999-2024 timeframe. The period plotted represents the most readily accessible long-term inventory available at the time of analysis.

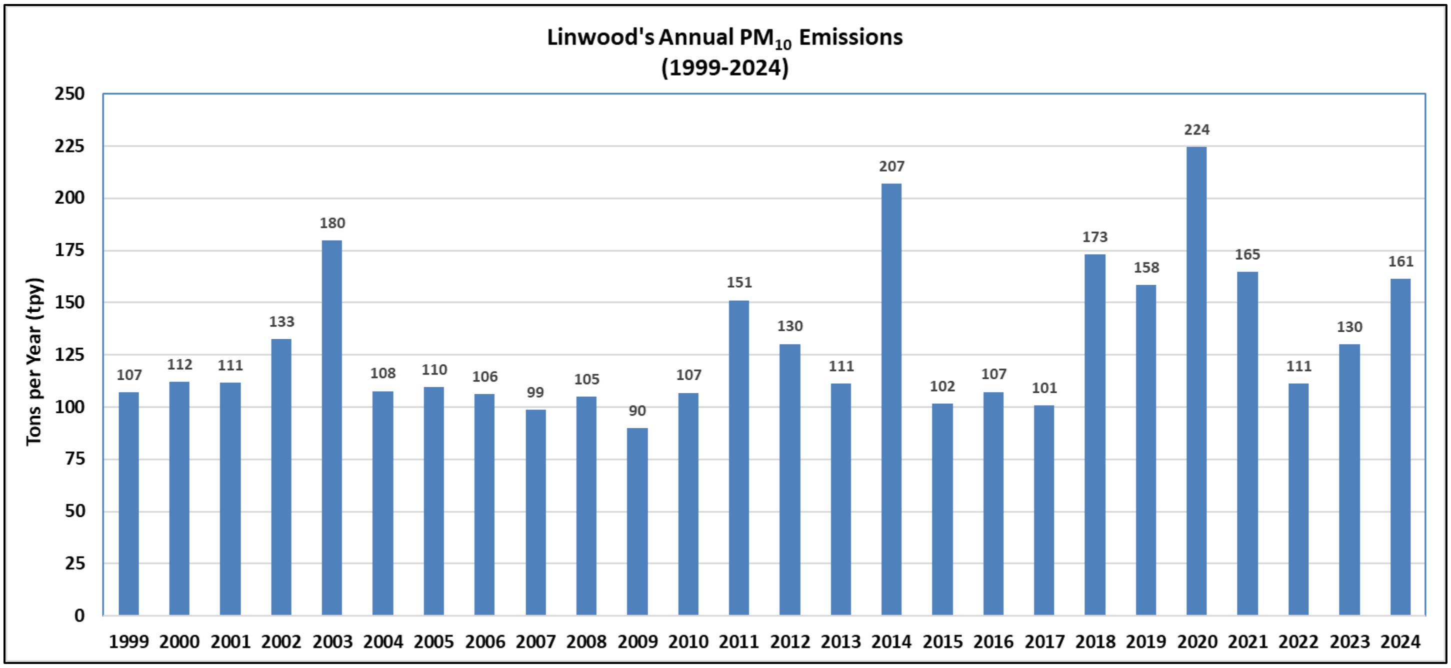

Figure 4-1. Linwood's 1999-2024 annual PM_{10} emissions, in tons per year.

Although the overall emissions trend appears to indicate growth, interannual variability is common and unpredictable. The largest totals often occur in the latter half of this period, but the ambient data produced no measured exceedances during those years (excluding 2023). That combination is perhaps unexpected; however, a simple examination of Linwood's total annual emissions does not account for the complex systems governing the relationships between its diverse emission units and their associated air quality impacts. Meteorology, terrain, and physical source parameters each strongly influence the resulting downwind pollutant concentrations. For example, higher wind speeds enhance pollutant dispersal from elevated stacks, generally reducing surface concentrations, but windy conditions can increase emissions from other source types, such as material storage piles, leading to higher concentrations near ground level.

Linwood's activities involve a variety of elevated and near-surface emissions sources. For example, Kilns 3 and 4 exhaust to the atmosphere through tall stacks (with heights above ground level of 110 and 140 feet, respectively) while the haul-road emissions occur close to ground level (based on vehicle height). Assorted quarrying, crushing, and material storage pile activities encompass a range of release heights and characteristics. This combination of disparate PM_{10} source types is not uncommon, but given the atmospheric and operational complexities involved, can limit the correlation between annual emission totals and measured concentrations at a single monitoring site. For example, during the 1999-2008 10-year period, Linwood's annual total PM_{10} emissions peaked in 2003, yet 2003 represents one of the four years within that range with no monitored exceedance. These findings might differ if additional measurement sites were available, but it is impractical to surround a facility with regulatory ambient air quality monitors.

The spatial and resource constraints associated with ambient monitoring are not unsolvable limitations. Dispersion modeling techniques eliminate the coverage gap by utilizing dense receptor grids. They further incorporate all relevant emissions sources in an area, the sources' physical parameters, representative meteorological data, topographical information, and land-use characteristics. While not a replacement for ambient monitoring, dispersion models have the added capacity, and are the preferred method, for evaluating the expected impacts from new or modified emission units prior to construction. If the model predicts NAAQS compliance, DNR can permit such changes. Accordingly, dispersion modeling results supported development of the original Buffalo PM_{10} control strategy, and the latest modeling provides results that justify the adequacy of Linwood's revised control measures.

5. Linwood's Revised Control Measures

In coordination with the facility, and with the support of new dispersion modeling, DNR is updating Linwood's control measures for maintaining the 24-hour PM_{10} NAAQS in the Buffalo area. The measures include numerical PM_{10} emission limits, applying chemical dust suppressant to the unpaved haul roads, sweeping the paved haul roads, implementing source-specific fugitive dust plans (SSFDP) for storage piles, using windscreens around loading hoppers, applying water suppression at loadouts and crushers, and complying with operating restrictions, such as material throughput limits (*e.g.*, processing no more than a specific amount (tonnage) of limestone in a given piece of equipment in a given time period).

Instead of a new ACO, all requirements are specified in DNR-issued air quality construction permits. For this SIP revision, the DNR is requesting that EPA remove Linwood's original ACO (98-AQ-07) from the SIP and include the forty-one air quality construction permits[15] listed in Table 5-1 and included in Attachment A.

Table 5-1. Linwood's PM_{10} control measure summary and the air construction permits that replace the original ACO.

Emission Unit(s) Description	Emission Point	PM_{10} Control Measure Summary*	Permit Number	Date Issued
Rotary Lime Kiln 3	LP-4	Cyclone #3 and Limestone Mining Tunnel	73-A-219-S9	10/11/2024
Rotary Lime Kiln 4 System	LP-40	Baghouse	23-A-169-S1**	03/05/2026
Bluff Haul Roads [Paved and Unpaved]	HR-Bluff	Sweeping & Water Flushing (Paved); Dust Suppressant (Unpaved)	25-A-229	12/10/2025
River Haul Roads [Paved and Unpaved]	HR-River	Sweeping & Water Flushing (Paved); Dust Suppressant (Unpaved)	25-A-230	12/10/2025
Material Storage Piles	Storage Piles	n/a	18-A-110-S2	09/24/2025
East Barge Loadout	BL01	Windscreen and Water Suppression	02-A-168-S4	05/27/2025
West Barge Loadout	BL02	Windscreen and Water Suppression	02-A-169-S4	05/27/2025
Old Mill	CC-1	Baghouse	71-A-084-S13	08/27/2020
New Mill	CC-2	Baghouse	86-A-049-S9	03/14/2019
Calcium Loadout [Truck and Railcar]	CC-3	Baghouse	88-A-218-S6	03/13/2018
New Mill Dryer	CC-5	Baghouse	98-A-846-S2	07/14/2006
#6 Limestone Loadout System	CC-16	n/a	17-A-488-S3	09/18/2024
Lime Kiln Dust Tank and Loadout	LP-7	Baghouse	88-A-220-S5	03/13/2018
#4 Lime Truck Loadout System	LP-8	Baghouse	88-A-221-S10	07/02/2019
Ingredients Bin	LP-12	Baghouse	97-A-1084-S4	03/14/2019
Lime Rail Loadout System	LP-13	Baghouse	02-A-028-S6	03/13/2018
Dolo Processing System	LP-16	Baghouse	11-A-335-S3	03/14/2019
Dolo – Storage and Truck Loadout	LP-17	Baghouse	11-A-336-S3	03/14/2019
Solid Fuel Pile	Solid Fuel-01	3-Sided Building Enclosure	17-A-504-S2	12/10/2025
Solid Fuel Hopper	LP-20	n/a	17-A-495-S1	03/14/2019
Kilns Solid Fuel Conveyor and Tank	LP-24	n/a	17-A-494-S1	03/14/2019
Solid Fuel Crusher and Burner	LP-39	Baghouse	17-A-505-S2	07/02/2019

[15] DNR issues air construction permits on an individual basis by emission point. However, a permit option called a CAP (Collection of Air Permits) is available that combines the requirements and conditions for multiple emission points into one document.

Emission Unit(s) Description	Emission Point	PM_{10} Control Measure Summary*	Permit Number	Date Issued
Kiln #3 Rockbox and Conveyor	LP-36	n/a	17-A-491	03/13/2018
Quarry 1 Equipment and Pile 6	Q-1	SSFDP; Water Suppression	11-A-337-S1	09/06/2018
Sugarbeet Feed and Weigh Conveyors	Q-11C	Building Enclosure	18-A-111-S2	12/10/2025
Sugarbeet Stacker and Pile I	Pile I	Wind Screen for Pile I	25-A-231	12/10/2025
Q-12 Equipment [Aggregate Processing]	Q-12	n/a	20-A-156	09/03/2020
Q-2LP Crushing & Screening Lower Plant	Q-2LP	n/a	18-A-112-S2	09/25/2024
Quarry 2 Top Plant and Production Pile 4	Q-2TP	SSFDP; Water Suppression	18-A-113-S1	12/10/2025
Material Storage Pile 1	Pile 1	SSFDP	18-A-114-S1	12/08/2022
Material Storage Pile 8	Pile 8	SSFDP	18-A-115	09/06/2018
Material Storage Pile 14	Pile 14	SSFDP	18-A-116-S2	12/10/2025
Material Storage Piles and Conveyors [Pile A System]	Pile A	SSFDP; Windscreens	18-A-117-S3	12/10/2025
Kiln 4 Screener	LP-29	Building Enclosure	25-A-232	12/10/2025
Kiln 3 Screener	LP-35	Building Enclosure	25-A-233	12/10/2025
North Mill Dryer System	CC-20	Baghouse	25-A-181-S1	10/29/2025
North Mill Milling System	CC-21	Baghouse	25-A-182-S1	10/29/2025
North Mill Inside Dust System	CC-22	Baghouse	25-A-183-S1	10/29/2025
North Mill Loadout Dust System	CC-23	Baghouse	25-A-184-S1	10/29/2025
North Mill Tank Vent Dust System	CC-24	Baghouse	25-A-185-S1	10/29/2025
North Mill Dryer Convey System and Pile 16	CC-25	SSFDP	25-A-186-S2	12/10/2025

*****An “n/a” generally means that no physical control device or Source-Specific Fugitive Dust Plan (SSFDP) was necessary. Emission limits, material throughput restrictions, process constraints, or other operational conditions still apply.
**Linwood historically operated four rotary lime kilns, but Kilns 1 and 2 must be decommissioned (see permit Condition 5.A).

The construction permits do more than just replace Linwood’s original ACO, they strengthen the SIP. The permits encompass additional sources, establish new emission limits, contain new testing requirements, and increase Linwood’s monitoring, reporting, and record keeping obligations. In comparison to Linwood’s 1998 ACO, the construction permits also modernize the SIP by inherently incorporating nearly three decades of development in engineering, scientific, and dispersion modeling techniques.

6. Modeling Demonstration

DNR's dispersion modeling analysis demonstrates that the maximum permitted allowable emission rates from all PM_{10} sources at both Linwood and Continental Cement, in combination with the area's background concentration, does not produce a predicted 24-hour PM_{10} NAAQS violation at any location in ambient air in the Buffalo area.

6.1. Air Quality Model Selection

The EPA-recommended American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) was used to perform the analysis. DNR utilized the most current version (24142) of AERMOD available at the time and selected the regulatory default options, as recommended in the *EPA Guideline on Air Quality Models* (40 CFR 51 Appendix W). The following supporting pre-processing programs for AERMOD were also used:

- BPIP-Prime (version 04274)
- AERMET (version 22112)[16]
- AERMAP (version 18081)

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (<50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. DNR configured AERMOD with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from AERMAP
- PM10 pollutant keyword

6.2. Receptor Grid/Spacing/Terrain Elevations

Receptors were sited along and outside of the fence line boundaries of Linwood and Continental Cement. Figure 6-1 shows the receptor grid for the modeling analysis. Receptors were spaced at 50 meters both along the facility fence lines and throughout the grid. Two additional grids (not shown) were also created. In one grid, receptors were added on Linwood's property. In the other grid, receptors were added on Continental Cement's property. These grids were then used to evaluate the impacts of the emissions from one facility on the other facility's property.

Interpolated terrain elevations were incorporated into the model using United States Geological Survey (USGS) National Elevation Dataset (NED) data for Scott County in North American Datum 1983 (NAD83). All receptors were assigned a terrain height and hill height using the terrain preprocessor AERMAP.

6.3. Meteorological Data

Hourly meteorological data for the dispersion modeling analysis was preprocessed with the AERMET program by the DNR. The surface data was collected from the Moline, IL (KMLI) station with upper air data from the National Weather Service (NWS) station at Davenport (KDVN) for calendar years 2015-2019. Based on the results from a representivity study conducted by the DNR,[17] these meteorological data are considered representative of the conditions near Buffalo. Figure 6-2 shows the 2015-2019 five-year wind rose for the KMLI station.

6.4. Downwash

All building downwash analyses were conducted using version 04274 of EPA's Building Profile Input Program with Plume Rise Enhancements (BPIP-Prime).

[16] DNR conducted a sensitivity analysis and found that AERMET versions 22112 and 24142 produce identical results for all meteorological (met) stations of interest to Iowa, thus the raw met data was not reprocessed with AERMET version 24142.

[17] The representivity analysis is documented in the DNR's "*2015-2019 AERMOD Meteorological Data Technical Support Document*," dated January 1, 2021 (available upon on request).

Figure 6-1. Dispersion modeling receptor grid surrounding Linwood and Continental Cement.

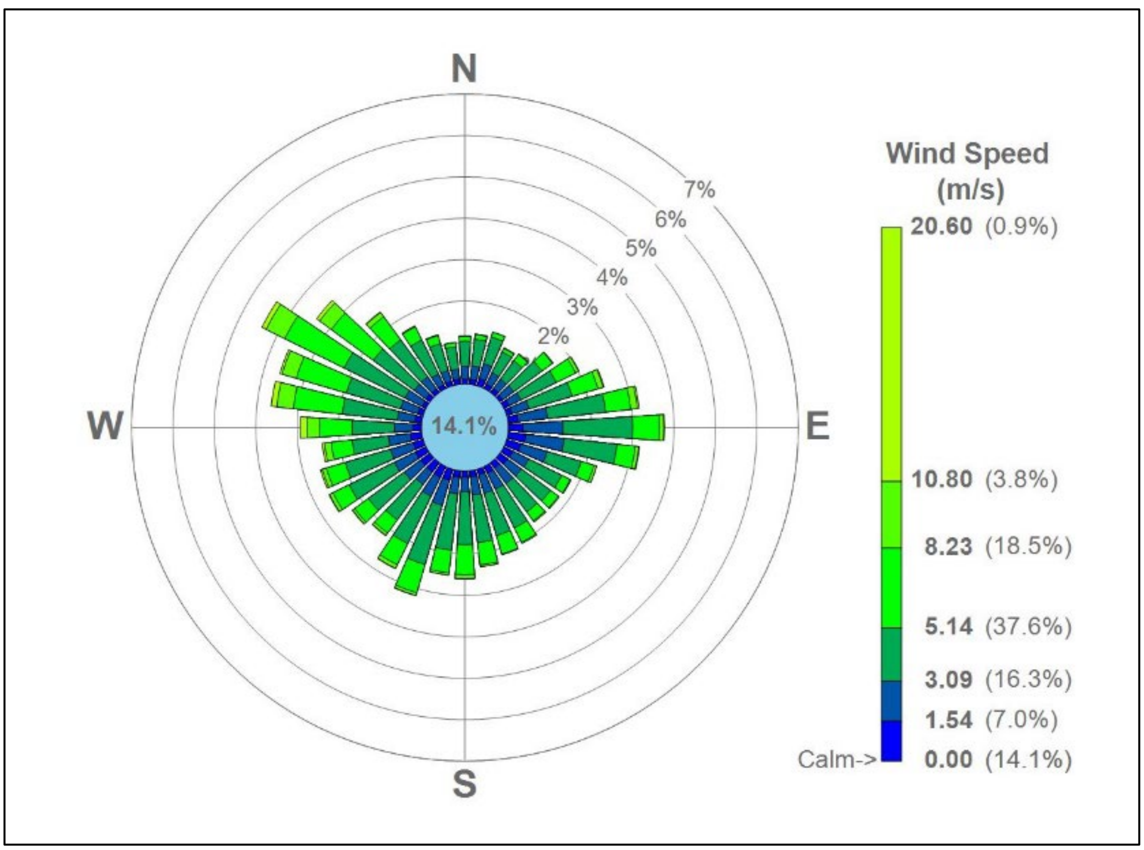

Figure 6-2. Moline, IL (KMLI) five-year wind rose (2015-2019).

6.5. Source Inventory

Linwood and Continental Cement are the only major PM_{10} sources in the Buffalo area. Each PM_{10} source at each facility was modeled at its current maximum permitted allowable emission rate. For point sources, actual stack parameters were used because each actual stack height is below its Good Engineering Practice (GEP) height. Emissions not vented through a stack, such as from quarrying activities, haul roads, storage piles, and some loadout activities, were modeled as either an area or a volume source, and where appropriate, their emissions were consolidated and summed for modeling purposes. In such cases, the source's modeled emission rate represents a combined maximum permitted allowable rate reflecting the limits from multiple sources across multiple air quality construction permits. For example, various storage piles, crushers, and haul roads located on the bluff-side of Linwood's facility were incorporated into a single area source (the "BLUFF_PILE" source ID in the model input file).

6.6. Background Concentration

To account for 24-hour average PM_{10} contributions from sources not explicitly modeled,[18] the DNR used a 2022-2024 PM_{10} background concentration of 34 µg/m^3. This value was calculated by averaging the 2022, 2023, and 2024 annual second maximum 24-hour averaged PM_{10} concentrations from the Jefferson School monitoring site (ID 19-163-0015). The Jefferson School site is located approximately 11 km northeast of Linwood, as indicated in Figure 6-3, and is the appropriate choice for developing a representative background concentration due to its proximity. No other PM_{10} monitoring sites provide a more suitable selection. When determining each year's second maximum value, DNR excluded all 24-hour averaged PM_{10} concentrations measured on days impacted by wildfire smoke.[19] Table 6-1 provides the resulting concentrations and background value.

Figure 6-3. Depiction of the monitoring site in Davenport used to construct the background concentration.

Table 6-1. Annual second maximum 24-hour averaged PM_{10} ambient concentrations (µg/m^3) for the background.

Site Name	Site ID	2022	2023	2024	3-Year Average
Jefferson School	19-163-0015	42	29	30	34

[18] Other types of sources that may emit PM_{10} in the area but are not explicitly modeled include minor point sources, nonpoint (area) sources, and mobile sources (both onroad and nonroad).
[19] See the "*Removal of Smoke Events TSD*" available on the DNR's background data webpage for a description of the methodology.

6.7. Results

The modeling analysis incorporated six operating scenarios for Linwood and two operating scenarios for Continental Cement. This requires modeling a total of twelve scenarios to ensure that each provides for continued attainment of the 24-hour PM_{10} NAAQS. The scenarios vary depending upon which combination of loadout options (at both Linwood and Continental Cement) and mills (at Linwood) are in use. For Linwood, only one of its two barge loadouts (BL01 or BL02) may operate at one time, and only two of its three mills (North Mill, New Mill and Old Mill) may operate at one time. For Continental Cement, its cement barge loadout is limited to operating a maximum of sixteen hours per day. That restriction is modeled using two scenarios, either operating during the first sixteen hours in the day (denoted simply as "Cement Barge Loadout AM") or the last sixteen hours in the day ("Cement Barge Loadout PM").

Table 6-2 summarizes the AERMOD model results for the twelve scenarios. The PM_{10} 24-hour modeled design value is the highest sixth highest predicted value from across the five-year modeled period (2015-2019). Figure 6-4 provides an example plot of the modeled highest sixth high concentration at each receptor for the scenario that produced the 114.4 µg/m^3 maximum modeled design value ("BL02, Old Mill & New Mill, Cement Barge Load Out AM"). In this case, the maximum concentration occurred along Highway 22, between the "river" and "bluff" sides of the Linwood facility.

To assess NAAQS compliance, the area's PM_{10} background concentration of 34 µg/m^3 is added to the modeled design value for a given scenario, and the result is rounded to the nearest 10 µg/m^3, consistent with the ambient data rounding provisions. Each of the twelve scenarios produces a total (rounded) value of 150 µg/m^3, meaning each meets the 24-hour PM_{10} NAAQS. Additionally, the DNR modeled the emissions from just Linwood with receptors added to Continental Cement's property, and vice versa. The total predicted concentrations from those analyses were less than the results from the twelve scenarios, and thus they also met the 24-hour PM_{10} NAAQS.

This modeling analysis demonstrates that the revised control measures developed for Linwood are protective of the current 24-hour PM_{10} NAAQS and it therefore supports the requested SIP revision to replace Linwood's ACO (98-AQ-07) with the air construction permits listed in Table 5-1.

Table 6-2. Cumulative modeled ambient air impact analysis for the 24-hour PM_{10} NAAQS in the Buffalo area.

Scenario	Modeled Source Group ID	Model Design Value (µg/m^3)	Background (µg/m^3)	Total (Rounded) (µg/m^3)
BL01, North Mill & New Mill, Cement Barge Load Out AM	AM_BL1NN	113.9	34	150
BL01, North Mill & New Mill, Cement Barge Load Out PM	PM_BL1NN	113.8	34	150
BL01, North Mill & Old Mill, Cement Barge Load Out AM	AM_BL1NO	114.0	34	150
BL01, North Mill & Old Mill, Cement Barge Load Out PM	PM_BL1NO	113.9	34	150
BL01, Old Mill & New Mill, Cement Barge Load Out AM	AM_BL1ON	114.2	34	150
BL01, Old Mill & New Mill, Cement Barge Load Out PM	PM_BL1ON	114.1	34	150
BL02, North Mill & New Mill, Cement Barge Load Out AM	AM_BL2NN	113.9	34	150
BL02, North Mill & New Mill, Cement Barge Load Out PM	PM_BL2NN	113.7	34	150
BL02, North Mill & Old Mill, Cement Barge Load Out AM	AM_BL2NO	114.1	34	150
BL02, North Mill & Old Mill, Cement Barge Load Out PM	PM_BL2NO	113.8	34	150
BL02, Old Mill & New Mill, Cement Barge Load Out AM	AM_BL2ON	114.4	34	150
BL02, Old Mill & New Mill, Cement Barge Load Out PM	PM_BL2ON	114.2	34	150

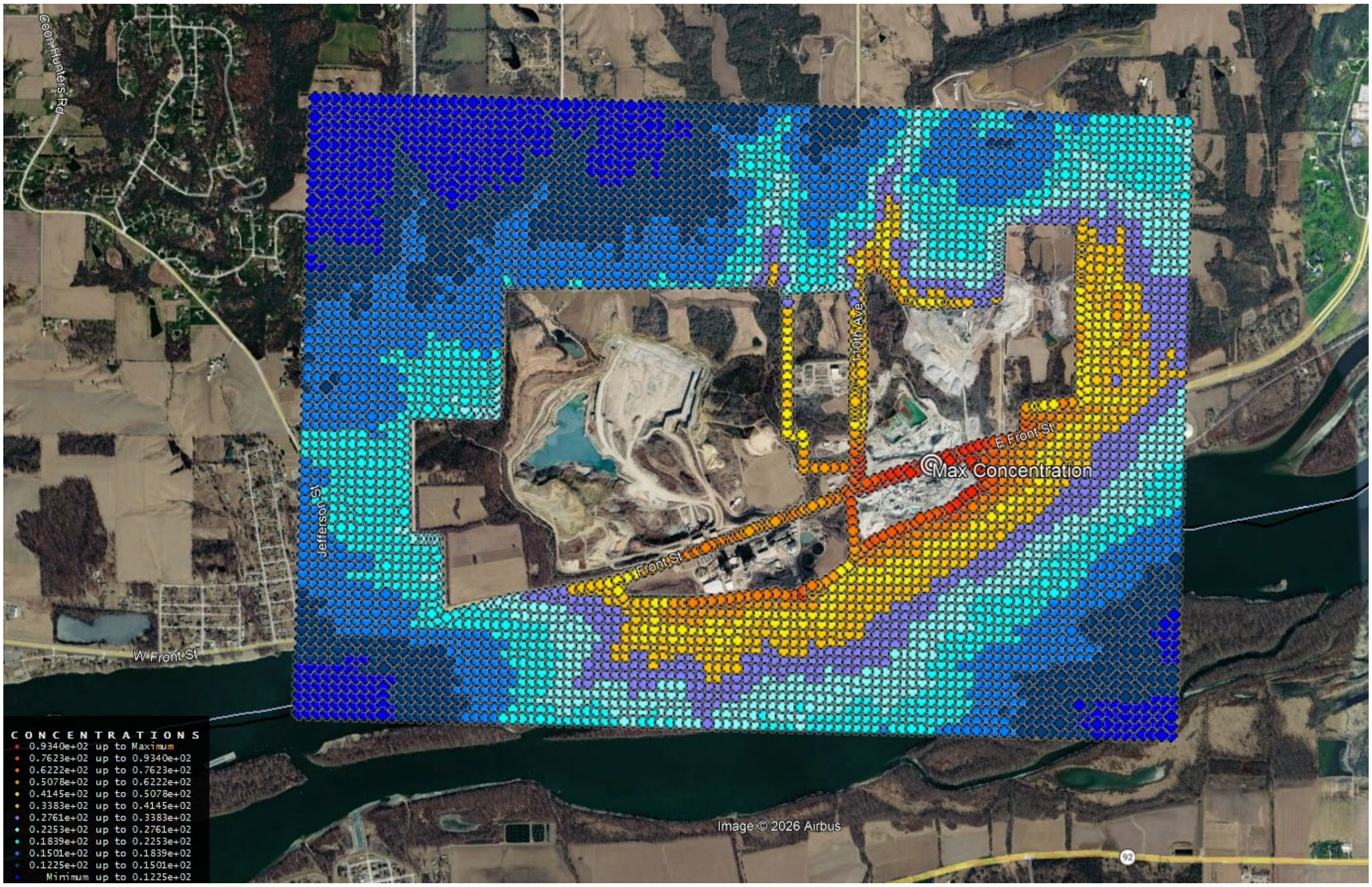

Figure 6-4. Maximum modeled impacts example (for Model Source Group "AM_BL2ON"), excluding background.

7. Administrative Materials

The submittal of this SIP revision complies with the procedural elements of Subpart F of 40 CFR 51 and the applicable criteria in Appendix V of 40 CFR 51, as discussed below and in Chapter 8.

A formal letter of submittal from the designee of the Governor of the State of Iowa, requesting EPA approval of the proposed revision to the SIP for the State of Iowa, is included with the SIP submittal. All the included air construction permits are in their final form, and the DNR followed all applicable procedural requirements of the state's laws and constitution in the adoption of this plan.

7.1. Legal Authority

The DNR is the regulatory agency with primary responsibility for outdoor air quality permitting and compliance activities in the State of Iowa. The department's authority is set forth in Iowa Code chapters 455A and 455B and implemented through 567 IAC Chapters 10 and 21-33 and 561 IAC Chapters 2 and 7. The DNR's permitting and compliance programs and associated rules have been approved by EPA into 40 CFR 52 Subpart Q as part of Iowa's SIP.

The DNR has the necessary legal authority under state statute to adopt and implement this SIP revision. Iowa Code section 455B.133(3) provides that the Iowa Environmental Protection Commission (EPC) shall "[a]dopt, amend, or repeal ambient air quality standards for the atmosphere of this state on the basis of providing air quality necessary to protect the public health and welfare […]."[20] Iowa Code section 455B.133(4) provides that the commission shall "[a]dopt, amend, or repeal emission limitations or standards relating to the maximum quantities of air contaminants that may be emitted from any air contaminant source." Iowa Code section 455B.134(9) states that the duties of the director include issuing "orders consistent with rules to cause the abatement or control of air pollution, or to secure compliance with permit conditions."

In combination with the DNR's existing legal authority and associated administrative regulations, this SIP revision is adequate to provide for continued attainment of the 24-hour PM_{10} NAAQS in the Buffalo area.

[20] Through that authority, DNR has adopted the federal PM_{10} NAAQS by reference in 567 IAC 22.11.

8. Public Participation

DNR will address this chapter after the public comment period has closed.