



February 7, 2025

Regional Administrator
U.S. EPA, Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

RE: North Dakota Initial Designation Recommendation for the 2024 Revised Primary Annual PM_{2.5} National Ambient Air Quality Standard

Dear Regional Administrator,

On February 7, 2024, the United States Environmental Protection Agency (EPA) promulgated a revised primary annual PM_{2.5} National Ambient Air Quality Standard (NAAQS), established at 9.0 µg/m³. As set forth in the final rule, EPA requested that States submit an initial PM_{2.5} designation recommendation to the EPA no later than February 7, 2025.

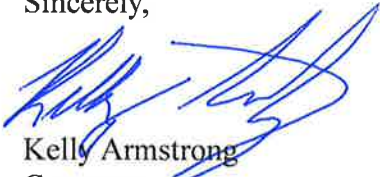
The North Dakota Department of Environmental Quality (NDDEQ) operates an extensive ambient air quality monitoring network with sites located across the State. Data collected from the North Dakota monitoring network forms the foundation for this recommendation. The NDDEQ has verified and entered the monitoring data into the EPA's Air Quality System (AQS) and has determined the monitoring data to be complete. NDDEQ notes that, despite receiving EPA's approval as a Federal Equivalent Method (FEM), the Teledyne T640/T640X continuous monitors consistently measure PM_{2.5} levels approximately 20% higher than collocated filter-based Federal Reference Method (FRM) monitors. EPA has been made aware of this problem by several states. The enclosure provides additional information.

As set forth by EPA, the State of North Dakota's initial designation recommendation is based on data from 2021-2023, the three most recent years of available monitoring data. The EPA final designation decisions are expected to be based on 2022-2024 monitoring data. In addition to the high FEM monitor bias, the three-year design values relied upon for the State initial designation recommendations and EPA final designation decisions are significantly increased due to unusually high periods of wildfire smoke in 2021, 2023, and 2024. The wildfire smoke was outside the regulatory control and jurisdictional borders of the NDDEQ. The wildfire smoke impacts paired with the revised primary annual PM_{2.5} NAAQS, required increased workload for the State of North Dakota to prepare Exceptional Event Demonstrations for 2023 and 2024. Exceptional Event data was submitted to EPA for concurrence which identified PM_{2.5} monitored concentrations impacted by an Exceptional Event and with concurrence are excluded from the data record and EPA final designation decisions. The enclosures provide additional information regarding monitoring data that was influenced by wildfire smoke as well as the 2021-2023 annual design values with and without wildfire smoke events.

Based on extensive review of the 2021-2023 monitoring data as well as the additional information regarding 2021 wildfire smoke impacted monitoring data and with requested EPA concurrence on all 2023 Exceptional Event impacted monitoring data, it is recommended that the entire State of North Dakota be designated as attainment for the revised primary annual 2024 PM_{2.5} National Ambient Air Quality Standard.

If you have any questions, please contact Jim Semerad or David Stroh with the Division of Air Quality within the NDDEQ at (701) 328-5188.

Sincerely,



Kelly Armstrong
Governor

C: L. David Glatt, Director, NDDEQ
Jim Semerad, Director, NDDEQ Division of Air Quality
Director, U.S. EPA Region 8 Air and Radiation Program

Enc.

**Enclosures for North Dakota Initial Designation Recommendation
2024 Revised Primary Annual PM_{2.5} National Ambient Air Quality Standard**

PM_{2.5} Annual Mean Concentrations

PM_{2.5} Annual Design Values

PM_{2.5} T640/T640X Federal Equivalent Method Monitor Data

Canadian Wildfire Smoke Particulate Matter Exceptional Event Demonstration – North Dakota –
May-September 2023

Wildfire Smoke Particulate Matter Exceptional Event Demonstration – North Dakota –2024

2021 Wildfire Smoke Impacted PM_{2.5} Monitoring Data

PM_{2.5} Annual Mean Concentrations

Monitor	County	PM _{2.5} Annual Mean* $\mu\text{g}/\text{m}^3$		
		2021	2022	2023
Painted Canyon (TRNP-SU)	Billings	5.42	5.53	7.37
Lostwood NWR	Burke	6.96	5.37	10.53
Bismarck Residential	Burleigh	8.68	6.98	10.75
Fargo NW	Cass	9.83	6.45	11.37
Lake Ilo NWR	Dunn	7.18	4.83	9.26
TRNP-NU	McKenzie	6.91	4.34	7.71
Beulah North	Mercer	6.95	4.60	8.31
Hannover	Oliver	8.18	6.40	9.42
Ryder	Ward	7.65	4.88	9.22

* Wildfire Smoke Events Included

PM_{2.5} Annual Design Values

Monitor	County	2021-2023 PM _{2.5} Annual Design Value $\mu\text{g}/\text{m}^3$		
		Wildfire Smoke Events		
		Included	2023 Excluded	2021 & 2023 Excluded
Painted Canyon (TRNP-SU)	Billings	6.1	5.5	5.4
Lostwood NWR	Burke	7.6	6.4	6.0
Bismarck Residential	Burleigh	8.8	7.8	7.3
Fargo NW	Cass	9.2	8.5	7.7
Lake Ilo NWR	Dunn	7.1	6.1	5.7
TRNP-NU	McKenzie	6.3	5.5	5.2
Beulah North	Mercer	6.6	5.9	5.6
Hannover	Oliver	8.0	7.0	6.5
Ryder	Ward	7.3	6.2	5.7

PM_{2.5} T640/T640X Federal Equivalent Method Monitor Data

A technical problem is that, despite receiving EPA's approval as a FEM, the Teledyne T640/T640X continuous monitors consistently measure PM_{2.5} levels approximately 20% higher than collocated filter-based FRM monitors.¹

In the 2023 Annual Ambient Air Monitoring Data Certification letter² to U.S. EPA, North Dakota acknowledged EPA's implementation of an alignment algorithm to update previously collected PM_{2.5} T640/T640X FEM monitor data in EPA's AQS³. Within this Initial Designation Recommendation, as well as North Dakota's Canadian Wildfire Smoke Particulate Matter Exceptional Event Demonstration – May-September 2023⁴ the PM_{2.5} data at Lostwood NWR, Bismarck NCORE, Fargo NW, Lake Ilo, TRNP-NU, Beulah North, Hannover, and Ryder reflect the alignment algorithm developed by Teledyne and implemented in the Teledyne firmware update July of 2023, as well as retroactively implemented by EPA in AQS.

While the alignment algorithm resulted in an improvement in the T640/T640X FEM PM_{2.5} monitor bias compared to FRM monitors, it did not sufficiently correct the bias. Unfortunately, the bias is so significant that, for the revised primary annual 2024 PM_{2.5} NAAQS the ongoing bias could lead to an area being designated nonattainment based on T640/T640X FEM monitored data while the area would have been designated attainment based on FRM monitored concentrations.⁵

Aside from NDDEQ's ongoing concern regarding the T640/T640X FEM monitor bias, the NDDEQ has requested that the EPA concur with the exclusion of 2023 PM_{2.5} Exceptional Event concentrations from the data record such that all sites in North Dakota will demonstrate attainment of both the PM_{2.5} 24-hour and annual NAAQS. (See North Dakota's Canadian Wildfire Smoke Particulate Matter Exceptional Event Demonstration – May-September 2023⁶.) Additionally, the 2021-2023 PM_{2.5} monitoring data, excluding 2021 and 2023 wildfire smoke impacted monitoring data, supports an initial designation recommendation that the entire State of North Dakota be designated as attainment for the revised primary annual PM_{2.5} NAAQS.

¹ https://cleanairact.org/wp-content/uploads/2024/06/AAPCA-Article-EM-June-2024-Final_updated.pdf

² https://www.deq.nd.gov/AQ/Notices/EE/2023CanadianWildfireEEDemonstration_DRAFT.pdf, See Appendix B.

³ Air Quality System (AQS) – U.S. EPA's computer database and information system of ambient air quality data.

⁴ https://www.deq.nd.gov/AQ/Notices/EE/2023CanadianWildfireEEDemonstration_DRAFT.pdf

⁵ <https://cleanairact.org/wp-content/uploads/2024/12/AAPCA-Letter-Regarding-Teledyne-Bias-FINAL-12-20-24.pdf>

⁶ https://www.deq.nd.gov/AQ/Notices/EE/2023CanadianWildfireEEDemonstration_DRAFT.pdf

Canadian Wildfire Smoke Particulate Matter Exceptional Event Demonstration – North Dakota – May-September 2023

From mid-May through mid-September of 2023, smoke from wildfires across Canada directly affected the air quality in North Dakota. The 2023 Canadian wildfires produced particulate matter (PM) emissions that are outside the regulatory control and jurisdictional borders of the NDDEQ, which regulates air pollution on state land within the State of North Dakota.

The U.S. EPA's Treatment of Data Influenced by Exceptional Events (Exceptional Event Rule) (40 CFR § 50.14) details what air regulatory agencies must demonstrate in order to exclude exceptional event-related concentrations from regulatory determinations.

The NDDEQ prepared the Canadian Wildfire Smoke Particulate Matter Exceptional Event Demonstration – North Dakota – May-September 2023⁷, which addressed all required components of a request to exclude exceptional event-related data, as detailed in 40 CFR § 50.14. As set forth for the revised primary annual PM_{2.5} NAAQS designation process, EPA requested that States submit their 2023 Exceptional Event Demonstrations to the agency no later than February 7, 2025. The State of North Dakota is submitting to EPA Region 8 the Canadian Wildfire Smoke Particulate Matter Exceptional Event Demonstration – North Dakota – May-September 2023 concurrent with the North Dakota Initial Designation Recommendation for the 2024 Revised Primary Annual PM_{2.5} National Ambient Air Quality Standard. With submittal of the 2023 Exceptional Event Demonstration to EPA Region 8, the NDDEQ has requested that the EPA concur with the exclusion of 2023 PM_{2.5} Exceptional Event concentrations from the data record such that all sites in North Dakota will demonstrate attainment of both the PM_{2.5} 24-hour and annual NAAQS.

Wildfire Smoke Particulate Matter Exceptional Event Demonstration – North Dakota – 2024

From May through November of 2024, smoke from wildfires across Canada and the United States directly affected the air quality in North Dakota. The 2024 wildfires produced PM emissions that are outside the regulatory control and jurisdictional borders of the NDDEQ, which regulates air pollution on state land within the State of North Dakota.

The NDDEQ will prepare the Wildfire Smoke Particulate Matter Exceptional Event Demonstration – North Dakota – 2024 to address all required components of a request to exclude exceptional event-related data, as detailed in 40 CFR § 50.14. As set forth for the revised primary annual PM_{2.5} NAAQS designation process, EPA requested that States submit 2024 Exceptional Event Demonstrations to the EPA no later than September 30, 2025.

⁷ https://www.deq.nd.gov/AQ/Notices/EE/2023CanadianWildfireEEDemonstration_DRAFT.pdf

2021 Wildfire Smoke Impacted PM_{2.5} Monitoring Data

EPA's Area Designations Memorandum for the 2024 Revised Annual PM_{2.5} National Ambient Air Quality Standards and Tribal Guidance⁸ states that

States and Tribes need not submit completed exceptional events demonstrations for data years that will not be relied upon by the EPA in making final designations decisions, however, they are expected to clearly indicate to the EPA if they believe that any air quality data they rely on in their area designations recommendations were influenced by exceptional events.

As specified in EPA's Area Designations Memorandum, the NDDEQ did not prepare an exceptional event demonstration for 2021 wildfire smoke impacted PM_{2.5} monitoring data. While 2021 is a monitoring data year the State of North Dakota must rely upon for the initial designation recommendation (2021-2023), 2021 will not be a year EPA relies upon in making final designation decisions (2022-2024). As such, the NDDEQ considers this Enclosure for the North Dakota Initial Designation Recommendation 2024 Revised Primary Annual PM_{2.5} National Ambient Air Quality Standard, to provide to EPA all components to clearly indicate that 2021 wildfire smoke impacted PM_{2.5} monitoring data relied upon in the initial designation recommendation were influenced by wildfire smoke exceptional events.

All nine North Dakota air monitoring sites were impacted by smoke from wildfires across Canada and the United States from early-April through mid-October 2021, causing daily PM_{2.5} concentrations to exceed the level of the 24-hour PM_{2.5} NAAQS of 35 µg/m³ and new 2024 PM_{2.5} Annual NAAQS of 9.0 µg/m³. The 2021 wildfires produced particulate matter emissions that are outside the regulatory control and, in all but one instance, outside the jurisdictional borders of the NDDEQ, which regulates air pollution on state land within the State of North Dakota.

The 2021 wildfire smoke impacts include 30 dates at nine PM_{2.5} monitors for a total of 94 PM_{2.5} monitor event days. The following table summarizes the daily PM_{2.5} concentrations that exceeded the level of the 24-hour PM_{2.5} NAAQS as a result of the 2021 wildfire smoke impacts.

⁸ https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-designations-memo_2.7.2024_-jg-signed.pdf

Date of Event	Type of Event	AQS Flag(s)	Monitor (AQS ID)	Monitor Name	PM _{2.5} Concentration (µg/m ³)	Notes
4/5/2021	Wildfires	IT	38-053-0002	TRNP-NU	51.4	2021 Wildfire Smoke - North Dakota TRNP NU Horse Pasture Wildfire
5/20/2021	Wildfires	IF	38-053-0002	TRNP-NU	50.4	2021 Wildfire Smoke - Canada
	Wildfires	IF	38-101-0003	Ryder	36.7	
7/6/2021	Wildfires	IF	38-017-1004	Fargo NW	58.6	2021 Wildfire Smoke - Canada
7/12/2021	Wildfires	IF	38-017-1004	Fargo NW	40.5	2021 Wildfire Smoke - Canada
7/13/2021	Wildfires	IF	38-017-1004	Fargo NW	53.3	2021 Wildfire Smoke - Canada
7/14/2021	Wildfires	IF	38-015-0003	Bismarck Residential	42.3	2021 Wildfire Smoke - Canada
	Wildfires	IF	38-017-1004	Fargo NW	76.9	
	Wildfires	IF	38-065-0002	Hannover	39.3	
7/15/2021	Wildfires	IT, IF	38-017-1004	Fargo NW	85.8	2021 Wildfire Smoke - US & Canada
7/16/2021	Wildfires	IT, IF	38-017-1004	Fargo NW	52.9	2021 Wildfire Smoke - US & Canada
7/20/2021	Wildfires	IF	38-017-1004	Fargo NW	56.2	2021 Wildfire Smoke - Canada
7/21/2021	Wildfires	IF	38-017-1004	Fargo NW	70.9	2021 Wildfire Smoke - Canada
7/24/2021	Wildfires	IT, IF	38-025-0004	Lake Ilo NWR	35.6	2021 Wildfire Smoke - US & Canada
7/25/2021	Wildfires	IT, IF	38-015-0003	Bismarck Residential	39.0	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-025-0004	Lake Ilo NWR	42.3	
	Wildfires	IT, IF	38-053-0002	TRNP-NU	38.8	
	Wildfires	IT, IF	38-057-0004	Beulah North	39.3	
	Wildfires	IT, IF	38-065-0002	Hannover	43.5	
7/29/2021	Wildfires	IF	38-017-1004	Fargo NW	79.2	2021 Wildfire Smoke - Canada
7/30/2021	Wildfires	IT, IF	38-007-0002	Painted Canyon (TRNP-SU)	53.1	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-015-0003	Bismarck Residential	99.4	
	Wildfires	IT, IF	38-017-1004	Fargo NW	134.4	
	Wildfires	IT, IF	38-025-0004	Lake Ilo NWR	72.9	
	Wildfires	IT, IF	38-057-0004	Beulah North	60.2	
	Wildfires	IT, IF	38-065-0002	Hannover	71.0	
	Wildfires	IT, IF	38-101-0003	Ryder	54.6	

Date of Event	Type of Event	AQS Flag(s)	Monitor (AQS ID)	Monitor Name	PM _{2.5} Concentration (µg/m ³)	Notes
7/31/2021	Wildfires	IT, IF	38-015-0003	Bismarck Residential	56.3	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-017-1004	Fargo NW	75.9	
	Wildfires	IT, IF	38-065-0002	Hannover	35.2	
8/1/2021	Wildfires	IT, IF	38-013-0004	Lostwood NWR	55.3	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-015-0003	Bismarck Residential	79.1	
	Wildfires	IT, IF	38-017-1004	Fargo NW	49.4	
	Wildfires	IT, IF	38-025-0004	Lake Ilo NWR	41.7	
	Wildfires	IT, IF	38-057-0004	Beulah North	56.1	
	Wildfires	IT, IF	38-065-0002	Hannover	65.7	
	Wildfires	IT, IF	38-101-0003	Ryder	62.8	
	Wildfires	IT, IF	38-015-0003	Bismarck Residential	35.0	
	Wildfires	IT, IF	38-017-1004	Fargo NW	68.0	
8/2/2021	Wildfires	IT, IF	38-057-0004	Beulah North	37.4	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-065-0002	Hannover	40.4	
	Wildfires	IT, IF	38-101-0003	Ryder	41.4	
	Wildfires	IT, IF	38-015-0003	Bismarck Residential	40.1	
8/3/2021	Wildfires	IT, IF	38-017-1004	Fargo NW	44.1	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-065-0002	Hannover	37.2	
	Wildfires	IT, IF	38-101-0003	Ryder	36.9	
	Wildfires	IT, IF	38-015-0003	Bismarck Residential	35.0	
8/4/2021	Wildfires	IT, IF	38-013-0004	Lostwood NWR	47.1	2021 Wildfire Smoke - US & Canada
8/5/2021	Wildfires	IT, IF	38-015-0003	Bismarck Residential	40.1	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-017-1004	Fargo NW	45.0	
	Wildfires	IT, IF	38-057-0004	Beulah North	37.8	
	Wildfires	IT, IF	38-065-0002	Hannover	42.0	
	Wildfires	IT, IF	38-101-0003	Ryder	46.3	

Date of Event	Type of Event	AQS Flag(s)	Monitor (AQS ID)	Monitor Name	PM _{2.5} Concentration (µg/m ³)	Notes
8/6/2021	Wildfires	IT, IF	38-013-0004	Lostwood NWR	43.6	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-015-0003	Bismarck Residential	50.1	
	Wildfires	IT, IF	38-017-1004	Fargo NW	48.8	
	Wildfires	IT, IF	38-053-0002	TRNP-NU	36.2	
	Wildfires	IT, IF	38-057-0004	Beulah North	40.9	
	Wildfires	IT, IF	38-065-0002	Hannover	48.8	
	Wildfires	IT, IF	38-101-0003	Ryder	47.3	
8/7/2021	Wildfires	IT, IF	38-065-0002	Hannover	38.4	2021 Wildfire Smoke - US & Canada
8/15/2021	Wildfires	IT, IF	38-025-0004	Lake Ilo NWR	37.2	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-053-0002	TRNP-NU	43.1	
	Wildfires	IT, IF	38-007-0002	Painted Canyon (TRNP-SU)	61.7	
8/16/2021	Wildfires	IT, IF	38-013-0004	Lostwood NWR	99.4	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-015-0003	Bismarck Residential	50.0	
	Wildfires	IT, IF	38-025-0004	Lake Ilo NWR	101.4	
	Wildfires	IT, IF	38-053-0002	TRNP-NU	99.9	
	Wildfires	IT, IF	38-057-0004	Beulah North	81.9	
	Wildfires	IT, IF	38-065-0002	Hannover	84.2	
	Wildfires	IT, IF	38-101-0003	Ryder	86.3	
	Wildfires	IT, IF	38-007-0002	Painted Canyon (TRNP-SU)	41.2	
	Wildfires	IT, IF	38-013-0004	Lostwood NWR	36.1	
	Wildfires	IT, IF	38-025-0004	Lake Ilo NWR	52.7	
8/17/2021	Wildfires	IT, IF	38-053-0002	TRNP-NU	53.7	2021 Wildfire Smoke - US & Canada
	Wildfires	IT, IF	38-057-0004	Beulah North	49.7	
	Wildfires	IT, IF	38-065-0002	Hannover	56.2	
	Wildfires	IT, IF	38-101-0003	Ryder	49.4	
9/10/2021	Wildfires	IT, IF	38-025-0004	Lake Ilo NWR	37.2	2021 Wildfire Smoke - US & Canada

Date of Event	Type of Event	AQS Flag(s)	Monitor (AQS ID)	Monitor Name	PM _{2.5} Concentration (µg/m ³)	Notes
10/2/2021	Wildfires	IF	38-013-0004	Lostwood NWR	52.9	2021 Wildfire Smoke - Canada
	Wildfires	IF	38-015-0003	Bismarck Residential	42.0	
	Wildfires	IF	38-101-0003	Ryder	43.7	
10/3/2021	Wildfires	IF	38-015-0003	Bismarck Residential	81.7	2021 Wildfire Smoke - Canada
	Wildfires	IF	38-065-0002	Hannover	54.6	
	Wildfires	IF	38-101-0003	Ryder	44.8	
10/7/2021	Wildfires	IF	38-013-0004	Lostwood NWR	39.8	2021 Wildfire Smoke - Canada
10/8/2021	Wildfires	IF	38-007-0002	Painted Canyon (TRNP-SU)	37.1	2021 Wildfire Smoke - Canada
	Wildfires	IF	38-013-0004	Lostwood NWR	50.9	
	Wildfires	IF	38-015-0003	Bismarck Residential	44.9	
	Wildfires	IF	38-025-0004	Lake Ilo NWR	72.9	
	Wildfires	IF	38-053-0002	TRNP-NU	61.4	
	Wildfires	IF	38-057-0004	Beulah North	57.7	
	Wildfires	IF	38-065-0002	Hannover	71.4	
	Wildfires	IF	38-101-0003	Ryder	72.5	
	Wildfires	IF				