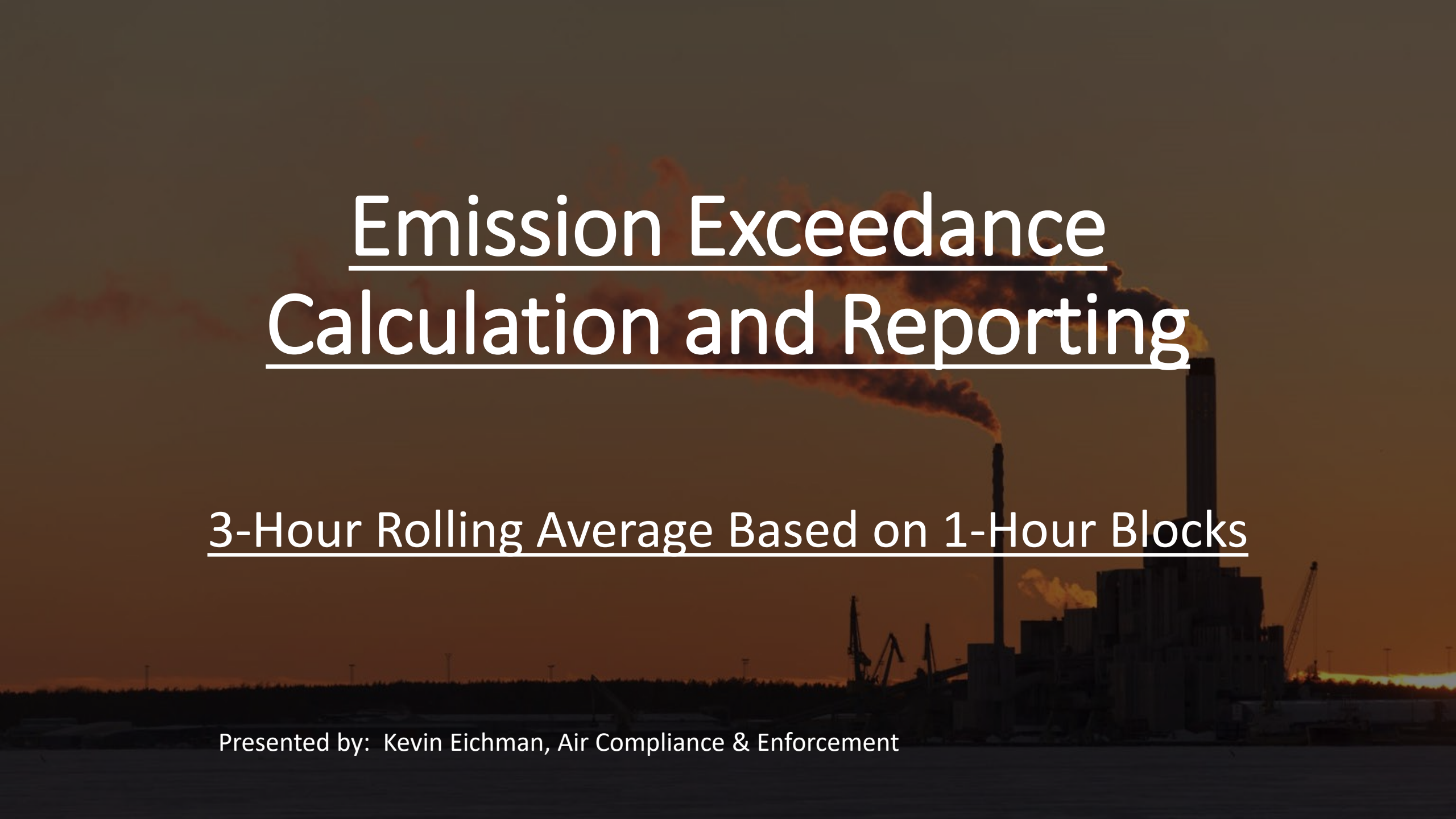

Emission Exceedance Calculation and Reporting

3-Hour Rolling Average Based on 1-Hour Blocks

Presented by: Kevin Eichman, Air Compliance & Enforcement

Why 3-Hour Rolling Average Based on 1-Hour Blocks?

- It is one of the most common averaging periods in Permits today
- It is the most difficult to understand averaging period
- We see the most reporting errors with this type of averaging period

Not intended to cover:

- Any averaging period other than 3 hr rolling average based on 1 hr blocks
- Startup/Shutdown Operating Scenarios
- Facilities that have peak and primary emission limits

How should exceedances be calculated?

TM1005 currently reads:

If the emission has a rolling averaging time*: Enter the average emission exceedance for the duration for the incident, in decimal hours.*

If one 3-hour block has an exceedance

The exceedance should be calculated as the average of each hour in the three-hour block.

If the exceedance "rolls" for greater than 3 hours

The exceedances should be calculated as the average of each 3-hour block that had been exceeded – i.e. the value is the average of the averages.

For all following Examples:

- Permit Language: NOx: Monitored by continuous emission monitor continuously, based on a 3-hour rolling average based on a 1-hour block average. [N.J.A.C. 7:27-22.16(e)]

- Permit limit 50 ppm (NOx) and assume all hours are valid hours unless otherwise noted.

Example - (1) 3hr block out of compliance

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6
40 ppm	40 ppm	60 ppm	50 ppm	45 ppm	40 ppm
Hours 1-3 in compliance (47 ppm)					
	Hours 2-4 in compliance (50 ppm)				
		Hours 3-5 out of compliance (52 ppm)			
			Hours 4-6 in compliance (45 ppm)		

In this case a three-hour block, hours 3 through 5, would be considered in violation and entered in the EER like this:

1	2	3	4	5	6		7	8	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/ 2021	NOX	50	ppm	3 hour rolling	hour 3	hour 5	3.0 hrs	52 ppm	3.1

The value is the average of the hours in the 3-hour block – i.e. [(60+50+45)ppm]/3 = 52.0 ppm

Example - (1) exceedance rolls to 5 hrs

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6
30 ppm	45 ppm	90 ppm	50 ppm	40 ppm	25 ppm
Hours 1-3 out of compliance (55 ppm)					
	Hours 2-4 out of compliance (62 ppm)				
		Hours 3-5 out of compliance (60 ppm)			
			Hours 4-6 in compliance (38 ppm)		

In this case a 5-hour block, hours 1 through hour 5, would be considered in violation and would be entered in the EER like this:

1	2	3	4	5	6		7	8	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/2021	NOX	50	ppm	3 hour rolling	hour 1	hour 5	5.0 hrs	59 ppm	18%

The value is the average of the averages – i.e. [(55+62+60)ppm]/3 = 59.0 ppm

Example - Multiple hours out of compliance

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8	Hour 9
50 ppm	40 ppm	80 ppm	45 ppm	65 ppm	50 ppm	75 ppm	30 ppm	30 ppm
Hours 1-3 out of compliance (57ppm)								
	Hours 2-4 out of compliance (55 ppm)							
		Hours 3-5 out of compliance (63 ppm)						
			Hours 4-6 out of compliance (55 ppm)					
				Hours 5-7 out of compliance (63 ppm)				
					Hours 6-8 out of compliance (52 ppm)			
						Hours 7-9 in compliance (45 ppm)		

In this case an 8-hour block, hours 1 through 8, would be considered in violation and would be entered in the EER like this:

1	2	3	4	5	6		7	8	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/2021	NOX	50	ppm	3 hour rolling	hour 1	hour 8	8.0 hrs	57.5 ppm	15%

Example - Multiple non-consecutive hours out of compliance

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8	Hour 9
50 ppm	45 ppm	60 ppm	45 ppm	40 ppm	70 ppm	50 ppm	50 ppm	30 ppm
Hours 1-3 out of compliance (52 ppm)								
	Hours 2-4 in compliance (50 ppm)							
		Hours 3-5 in compliance (48 ppm)						
			Hours 4-6 out of compliance (52 ppm)					
				Hours 5-7 out of compliance (53 ppm)				
					Hours 6-8 out of compliance (57 ppm)			
						Hours 7-9 in compliance (40 ppm)		

In this case one 3-hour block, hours 1 through 3, AND (3) 3-hour blocks, hours 4 through 8 would be considered in violation and would be entered in the EER like this:

1	2	3	4	5	6		7	8	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/2021	NOX	50	ppm	3 hr rolling	hour 1	hour 3	3.0 hrs	52 ppm	4.0%
5/16/2021	NOx	50	ppm	3 hr rolling	hour 4	Hour 8	5 hrs	54 ppm	8.0%

Example – Invalid data or source downtime

Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8	Hour 9
30 ppm	50 ppm	90 ppm	Invalid hour	Invalid hour	40 ppm	30 ppm	40 ppm	40 ppm
Hours 1-3 out of compliance (57 ppm)								
	Hours 2,3 and 6 out of compliance (60 ppm)							
		Hours 3,6 and 7 out of compliance (53 ppm)						

In this case a 5-hour block, Hours 1,2,3 6 & 7, would be considered out of compliance and would be entered in the EER report as follows:

1	2	3	4	5	6		7	8	9
Date	Emission	Permit Allowable	units	Averaging Time	Exceedance Start	Time end	Duration	Emission reading	% Deviation
5/16/21	NOX	50	ppm	3 hr rolling	Hour 1	Hour 7	5.0 hrs	56.7 ppm	13.4%

For questions:

Call your inspector (if known) or contact REO

Air Compliance and Enforcement, Northern Field Office For counties: Bergen, Essex, Hudson, Hunterdon, Morris, Passaic, Somerset, Sussex, Warren, and Union.	**973-656-4444 or** **AirCE-Northern@dep.nj.gov**
Air Compliance and Enforcement, Central Field Office For counties: Burlington, Mercer, Middlesex, Monmouth, and Ocean.	**609-292-3187 or** **AirCE-Central@dep.nj.gov**
Air Compliance and Enforcement, Southern Field Office For counties: Atlantic, Camden, Cape May, Cumberland, Gloucester, and Salem.	**856-614-3601 or** **AirCE-Southern@dep.nj.gov**