

Spokane Regional Clean Air Agency Air Quality Report - August 2016

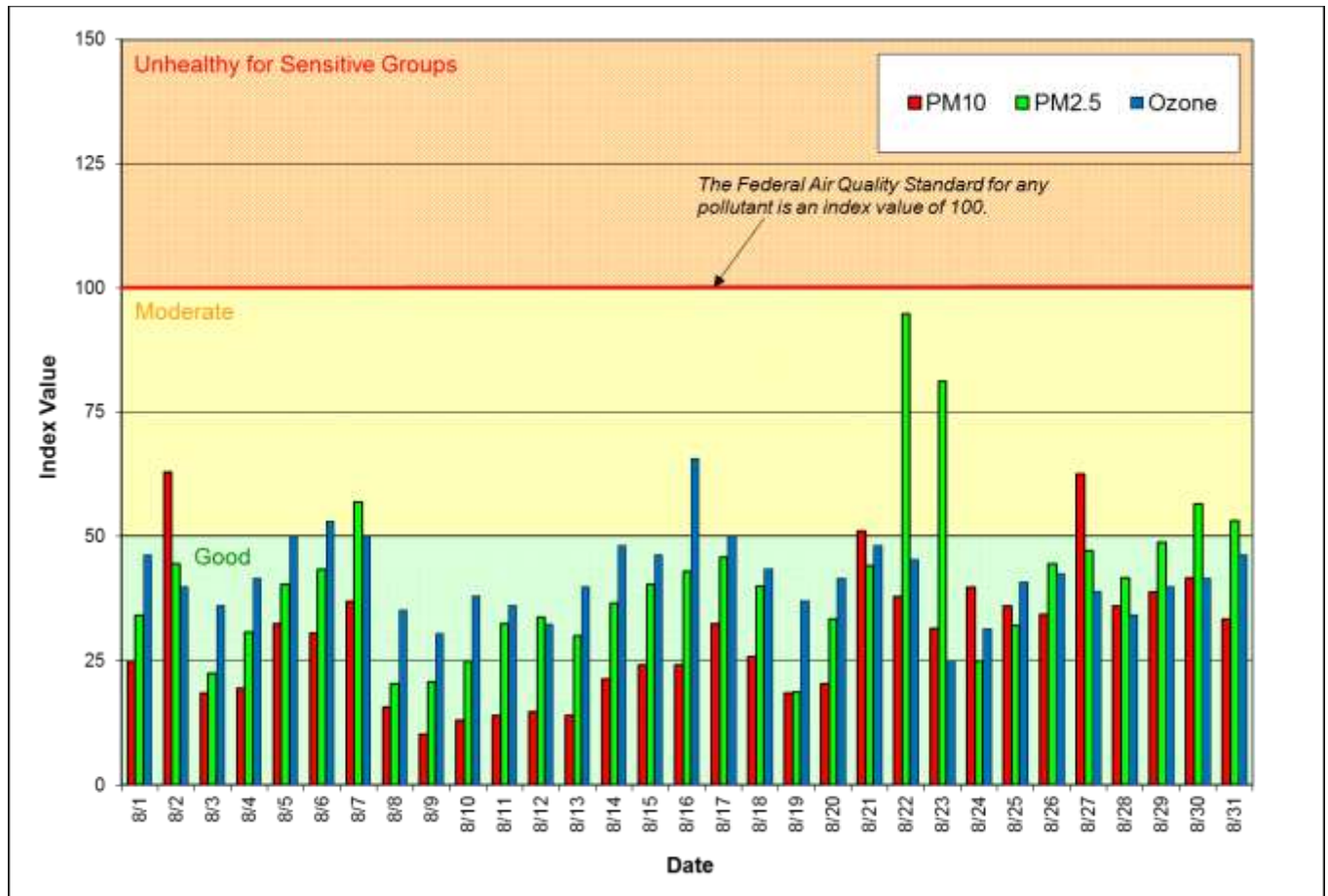
Wildfires ignited in the local area on August 21st when a dry storm system brought strong winds to the region. Fires that significantly affected air quality in the Spokane urban area and the approximate number of acres burned as of the 24th are as follows:

- Yale Road Fire: 5,700 acres in the vicinity of Spangle and Valleyford
- Hart Fire: 4,200 acres north of Davenport
- Cayuse Mountain Fire: 18,220 acres near Wellpinit
- Wellesley Fire: 365 acres on Beacon Hill near Spokane

Southwesterly to northwesterly winds carried smoke from these fires, most notably the Yale Road Fire, to the Spokane urban area on the 21st through the 23rd. The wind direction shifted to northeasterly on the 24th and pushed the smoke away from the Spokane area.

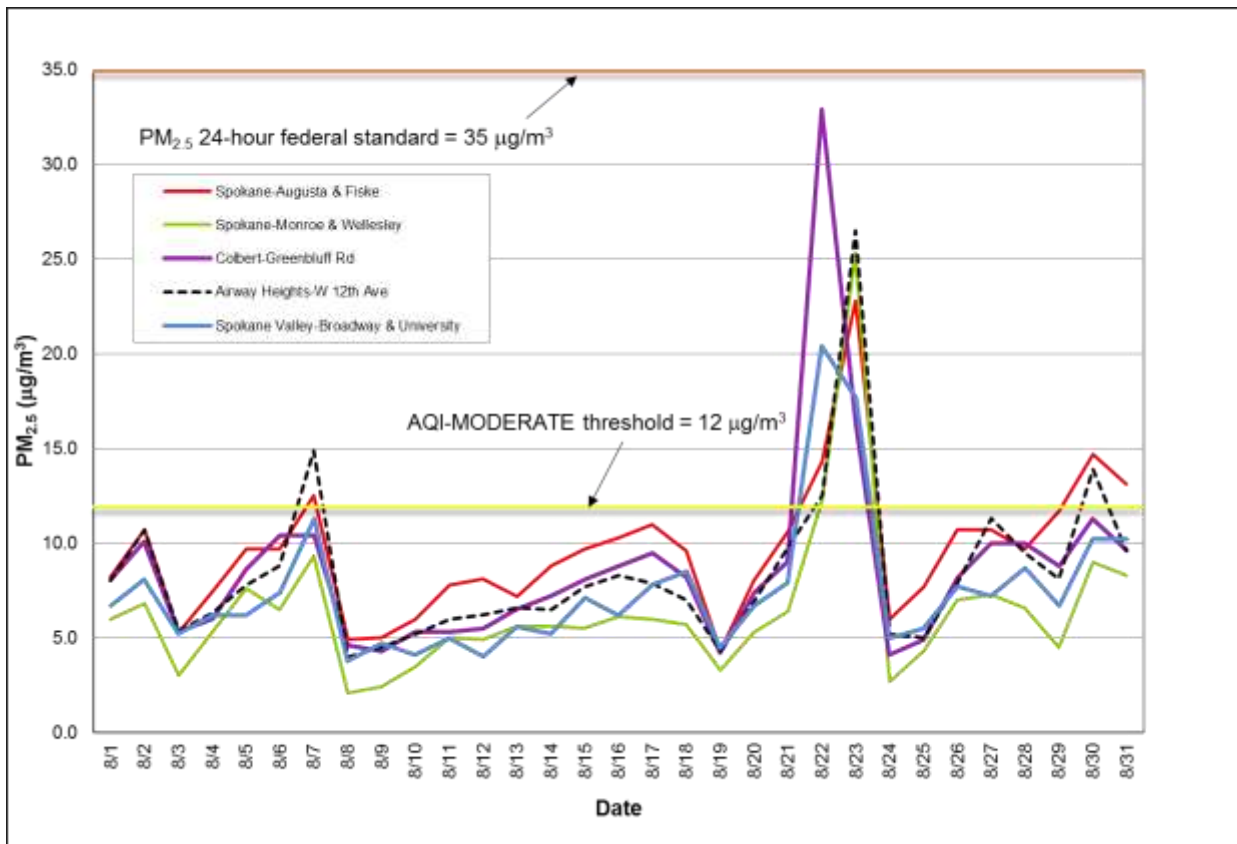
Ground-level ozone led the Air Quality Index (AQI) most days in August, but fine particulate matter (PM_{2.5}) reached the highest levels according to the AQI because of the wildfires. The maximum AQI value for the month was 95/MODERATE, measured at Colbert on the (24-hour average mass concentration = 10.9 µg/m³; Figure 1). Ground-level ozone reached an AQI of 66 (8-hour average = 0.059 ppm) on the 16th and particulate matter (PM₁₀) reached an AQI of 63 (24-hour average mass concentration = 80 µg/m³) on the 2nd.

Figure 1: Air Quality Index (AQI) values for August 2016. The data represent the maximum AQI values across all monitoring stations within Spokane County.



See Appendix 1 of this report for information about federal air quality standards or Appendix 2 for a description of the AQI. Daily mass concentrations of PM_{2.5} monitored in August throughout the network are shown in Figure 2.

Figure 2: Multi-station 24-hour average PM_{2.5} for August 2016; Spokane County. High levels of PM_{2.5} on the 22nd and 23rd were a result of wildfire smoke.



The August daily air quality data for all monitoring stations in the Spokane region are provided in Appendix 3. Current and historical air quality data can be obtained electronically from Ecology’s air monitoring data website, <https://fortress.wa.gov/ecy/enwiwa/Default.htm>.

Tables 1 and 2 contain the maximum AQI values for each pollutant for the month and for the year to date. Table 3 summarizes the year to date daily AQIs by category and compares them to last year's AQIs.

Table 1: Maximum AQI values and pollutant concentrations for this reporting period

Pollutant	AQI/Concentration	Location	Date
O ₃	66/0.059 ppm (8 hour)	Spokane, Greenbluff	8/16
PM ₁₀	63/80 µg/m ³	Turnbull National Wildlife Refuge	8/2
PM _{2.5}	95/32.9 µg/m ³	Colbert	8/22

Table 2: Maximum AQI values and pollutant concentrations to date this year. Carbon monoxide (CO) monitoring was permanently shut down in July 2016.

Pollutant	AQI/Concentration	Location	Date
CO	22/2.0 ppm (8 hour)	Spokane, 3rd & Washington	2/9, 2/10
O ₃	66/0.059 ppm (8 hour)	Spokane, Greenbluff	6/29, 8/16
PM ₁₀	63/80 µg/m ³	Turnbull National Wildlife Refuge	8/2
PM _{2.5}	95/32.9 µg/m ³	Colbert	8/22

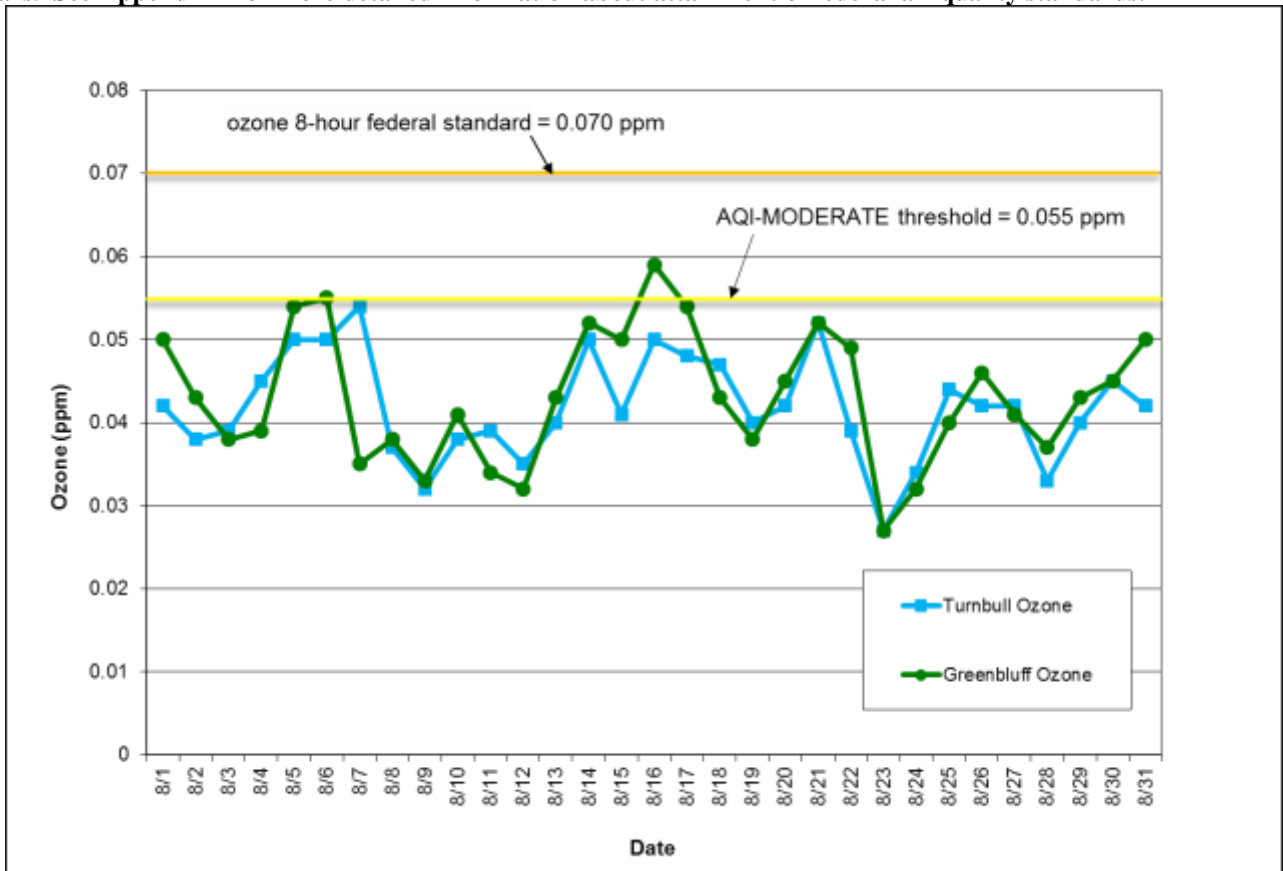
Table 3: AQI summary as of August 31, 2016. There were three days of invalidated data in 2015 because of a problem with the central server at Department of Ecology.

Category	Number of Days This Year	Last Year to Date*
Good (0-50)	199	170
Moderate (51-100)	45	57
Unhealthy for Sensitive Groups (101-150)	0	8
Unhealthy (151-200)	0	5
Very Unhealthy (201-300)	0	0
Hazardous (>300)	0	0

Ground-level ozone is formed when nitrogen oxides and volatile organic compounds chemically react in the presence of sunlight. It is measured in units of parts per million (ppm) in ambient air. Ozone is a strong oxidizer and can damage lung tissue, thereby impairing respiratory function. The main sources of ozone precursors are motor vehicle emissions and refueling, gasoline storage and transport, paints, solvents and industry.

The maximum 8-hour running average ozone concentration for the month was 0.059 ppm measured at Greenbluff on the 16th (Figure 3). Eight hour average ozone concentrations in the range 0.055 to 0.070 ppm are considered “moderate” air quality by the AQI. When concentrations are below that level, air quality is “good” with respect to ground-level ozone.

Figure 3: Eight hour maximum ozone concentrations for the Spokane region in August. The threshold for the moderate category of the AQI for ozone is 0.055 ppm averaged over eight hours. An ozone measurement above 0.070 ppm, averaged over eight hours, is the level of the federal ozone standard. It is not a violation of the standard to exceed this level on a given day because determination of attainment status is based on averaging data over a period of years. See Appendix 1 for more detailed information about attainment of federal air quality standards.



Appendix 1 – National Ambient Air Quality Standards

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants, carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), particulate matter (PM₁₀ and PM_{2.5}), ground-level ozone (O₃) and sulfur dioxide (SO₂; Table A-1). These are known as “criteria” pollutants because the US EPA established regulatory limits to concentrations in ambient air using human health or environmentally based criteria. Carbon monoxide, particulate matter and ozone are monitored in Spokane County by the Spokane Regional Clean Air Agency (SRCAA) and the Washington State Department of Ecology (Ecology).

Table A-1: National Ambient Air Quality Standards

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month period	0.15 µg/m ³ (1)	Not to be exceeded
Nitrogen Dioxide (NO₂)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O₃)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	PM _{2.5}	primary	1 year	12.0 µg/m ³	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m ³	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
	PM ₁₀	primary and secondary	24 hours	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO₂)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.

(2) The level of the annual NO₂ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

Appendix 2 – Air Quality Index

The Air Quality Index (AQI) is EPA’s color-coded tool for communicating daily air quality to the public and can be calculated for any of the criteria pollutants except lead, provided monitoring data are available. An index value above 100 indicates that the concentration of a criteria pollutant exceeded the limit established in the NAAQS. Categories of the AQI are “good” (green, 0-50), “moderate” (yellow, 51-100), “unhealthy for sensitive groups” (orange, 101-150), “unhealthy” (red, 151-200), “very unhealthy” (purple, 201-300) and “hazardous” (maroon, 301-500; Table A-2).

Table A-2: Air pollutant breakpoints for the Air Quality Index.

Air Quality Index Levels of Health Concern	Color Code	Index Numerical Value	Breakpoints				Health Effects
			O ₃ (ppm) 8-hour	PM _{2.5} (µg/m ³) 24-hour	PM ₁₀ (µg/m ³) 24-hour	CO (ppm) 8-hour	
Good	Green	0-50	0.000-0.054	0.0-12.0	0-54	0.0-4.4	Air quality is considered satisfactory and air pollution poses little or no risk.
Moderate	Yellow	51-100	0.055-0.070	12.1-35.4	55-154	4.5-9.4	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	Orange	101-150	0.071-0.085	35.5-65.4	155-254	9.5-12.4	People especially sensitive to air pollution may experience health effects. The general public is not likely to be affected. An AQI in this category or above indicates that air pollution exceeds levels acceptable under federal air quality standards.
Unhealthy	Red	151-200	0.086-0.105	65.5-150.4	255-354	12.5-15.4	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	Purple	201-300	0.106-0.200	150.5-250.4	355-424	15.5-30.4	Health alert: everyone may experience more serious health effects.
Hazardous	Maroon	>300	0.201 to the Significant Harm Level* (0.600 ppm, 2 hour average)	250.5+	425+	30.5+	Health warnings of emergency conditions. The entire population is more likely to be affected.

*The significant harm level (SHL) is set at a level that represents imminent and substantial endangerment to public health.

Appendix 3

Table A-3: Summary air quality data for August for air monitoring stations in Spokane County. The ground-level ozone data are maximum 8-hour running averages in parts per million (ppm) and the PM data are 24-hour averages in micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$).

Date	Ozone Greenbluff (8 hour max, ppm)	Ozone Turnbull NWR (8 hour max, ppm)	PM _{2.5} Augusta & Fiske BAM (24 hour avg, $\mu\text{g}/\text{m}^3$)	PM _{2.5} Broadway & University BAM (24 hour avg, $\mu\text{g}/\text{m}^3$)	PM _{2.5} Colbert TEOM (24 hour avg, $\mu\text{g}/\text{m}^3$)	PM _{2.5} Airway Heights TEOM (24 hour avg, $\mu\text{g}/\text{m}^3$)	PM _{2.5} Monroe & Wellesley nephelometer (24 hour avg, $\mu\text{g}/\text{m}^3$)	PM ₁₀ Augusta & Fiske TEOM (24 hour avg, $\mu\text{g}/\text{m}^3$)	PM ₁₀ Turnbull NWR BAM (24 hour avg, $\mu\text{g}/\text{m}^3$)
8/1	0.050	0.042	8.2	6.7	8.1	8.0	6.0	22	27
8/2	0.043	0.038	10.7	8.1	10.1	10.7	6.8	70	80
8/3	0.038	0.039	5.3	5.2	5.3	5.4	3.0	20	16
8/4	0.039	0.045	7.4	6.2	6.0	6.3	5.3	21	21
8/5	0.054	0.050	9.7	6.2	8.6	7.8	7.6	28	35
8/6	0.055	0.050	9.7	7.4	10.4	8.8	6.5	33	27
8/7	0.035	0.054	12.5	11.3	10.4	14.9	9.3	27	40
8/8	0.038	0.037	4.9	3.8	4.6	4.0	2.1	17	9
8/9	0.033	0.032	5.0	4.7	4.3	4.5	2.4	11	4
8/10	0.041	0.038	6.0	4.1	5.3	5.2	3.5	14	8
8/11	0.034	0.039	7.8	5	5.3	6.0	5.0	15	10
8/12	0.032	0.035	8.1	4	5.5	6.2	4.9	16	13
8/13	0.043	0.040	7.2	5.6	6.5	6.6	5.6	13	15
8/14	0.052	0.050	8.8	5.2	7.2	6.5	5.6	17	23
8/15	0.050	0.041	9.7	7.1	8.1	7.7	5.5	26	17
8/16	0.059	0.050	10.3	6.2	8.8	8.3	6.1	25	26
8/17	0.054	0.048	11.0	7.8	9.5	7.9	6.0	32	35
8/18	0.043	0.047	9.6	8.5	8.2	7.0	5.7	25	28
8/19	0.038	0.040	4.3	4.5	4.2	4.3	3.3	13	20
8/20	0.045	0.042	8.0	6.7	7.4	6.9	5.3	22	22
8/21	0.052	0.052	10.6	7.9	9.0	9.8	6.4	51	56
8/22	0.049	0.039	14.3	20.4	32.9	12.5	12.3	41	35
8/23	0.027	0.027	22.8	17.7	16.3	26.5	25.3	34	29
8/24	0.032	0.034	6.0	5	4.1	5.2	2.7	16	43
8/25	0.040	0.044	7.7	5.5	4.9	5.0	4.3	21	39
8/26	0.046	0.042	10.7	7.7	8.2	7.9	7.0	26	37
8/27	0.041	0.042	10.7	7.2	10.0	11.3	7.3	79	51
8/28	0.037	0.033	9.7	8.7	10.0	9.5	6.6	39	35
8/29	0.043	0.040	11.7	6.7	8.8	8.1	4.5	30	42
8/30	0.045	0.045	14.7	10.2	11.3	13.9	9.0	44	45
8/31	0.050	0.042	13.1	10.2	9.6	9.6	8.3	36	25
AVG	0.043	0.042	9.4	7.4	8.6	7.3	6.4	28	42
MAX	0.059	0.054	22.8	20.4	32.9	26.5	25.3	79	80