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Wisconsin Department of Natural Resources' QA/QC Procedures for Air Monitoring Data

Grant D. Hetherington
Wisconsin DNR
Air Monitoring Data Manager

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Presentation Outline

- Continuous data review
  - Daily
  - Monthly
- Discrete data review
- Precision and accuracy data review

Continuous Data – Daily Review

- Data from the prior business day up through the time of issuance of the current day's morning report are reviewed for completeness.

- Min/max values are scanned for any outliers.

- A zero/span report is generated and reviewed to determine if all nightly auto-verifications are within control limits.

- A morning report is generated and emailed to staff to help resolve any issues that are identified by the earlier review.

- Field staff email or phone-in evaluations of and solutions for problems indicated in the morning report. Emails and phone conversation summaries pertinent to the identified problems are saved for the monthly review.

Morning Report Excerpt

Zero/Span Report

- **Horicon (NO/NOY/NOY-NO):** 8/19 check exceeded 10 ppb for auto span. 8/20 check is missing due to instrument being offline for additional testing to resolve stability issue.

- **Milwaukee 16th St (O3):** Auto zero/span missing due to polling problems

Daily Report

- **Horicon (NO/NOY/NOY-NO):** Data missing since 8:00 on 8/19/12. Analyzer offline for additional testing to resolve stability issue.

- **Milwaukee-SSHC (Site):** O3 analyzer moved to site shelter on the roof. Met sensors are online with "rough" calibration, data may need to be invalidated based on final calibration. Computer is logging data, but broadband polling is not yet functional.

- **Potawatomi (PSTAT):** Several "4" status codes for membrane density deviation.

- **Potawatomi (Temp/RH):** offline due to suspect readings- probe may need to be replaced.

- **Rhinelander (ST):** Periods under 68 degrees, last hour was 63 degrees.

Zero/Span Report

Date: 2012-08-22

Airs ID	Site	Poc	Parameter	Data Source	Expected Zero	Observed Zero	Delta Zero	Expected Span	Observed Span	Delta Span
550790085	BAYSIDE	1	OZONE	INTERNAL	0	0	0	400	389	-11
550590019	CHIWAUKEE	1	OZONE	INTERNAL	0	-1	-1	400	416	16
550890008	GRAFTON	1	OZONE	INTERNAL	0	-1	-1	400	407	7
550890009	HARRINGTON BCH	1	OZONE	INTERNAL	0	0	0	400	405	5
551270005	LAKE GENEVA	1	OZONE	INTERNAL	0	0	0	400	405	5
550790010	MILW 16TH ST	1	OZONE	INTERNAL	0	3	3	400	414	14
550790026	MILW SER DNR	1	NO	INTERNAL	0	0	0	20	21.1	1.1
550790026	MILW SER DNR	2	NO	INTERNAL	0	-0.1	-0.1	20	19.3	-0.7
550790026	MILW SER DNR	1	NO2	INTERNAL	0	-0.4	-0.4	160	156.2	-3.8
550790026	MILW SER DNR	1	NOX	INTERNAL	0	-0.3	-0.3	180	177.3	-2.7
550790026	MILW SER DNR	1	NOY	INTERNAL	0	-1	-1	180	170.3	-9.7 **
550790026	MILW SER DNR	2	NOy-N	INTERNAL	0	-0.9	-0.9 E	160	151.1	-8.9 E
550790026	MILW SER DNR	1	OZONE	INTERNAL	0	2	2	400	385	-15
550790026	MILW SER DNR	1	SO2	INTERNAL	0	-0.3	-0.3	400	386.4	-13.6
551010017	RACINE	1	OZONE	INTERNAL	0	0	0	400	416	16
551170006	SHEBOYGAN	1	OZONE	INTERNAL	0	-1	-1	400	418	18
551330027	WAUK-CLEVELAND	1	OZONE	INTERNAL	0	1	1	400	415	15

***Indicates the delta values exceedes the control limits

###Indicates the delta values exceedes the warning limits two days in a row

**Indicates the delta values exceedes the warning limits

E Indicates the limits cannot be calculated

Continuous Data – Monthly Review

- All hourly data for the month are generated in a grid format. Blanks are inserted for missing data.

- All missing data codes are reviewed and verified using missing data reports.

- Any generic invalid codes are investigated and replaced with more specific codes.

- Any needed additional descriptions for invalid codes or flag codes are added in comment fields.

- Min/max data are reviewed for the month to provide an indication of proper instrument/sensor function.

Monthly Data Summary Report

Site:55-079-0085 BAYSIDE   Param: OZONE 44201   POC: 1   Data Units: 007 PARTS PER MILLION   Duration: 1 HR

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Mean	Max	Min
1	.029	.023	.021	.023	.024	.024	.026	.033	.035	.033	.036	.037	.042	.041	.043	.044	.043	.044	.042	.039	.03	.025	.024	.022	0.03	.044	.021
2	.022	.023	.011	.015	.026	.031	.034	.036	.041	.047	.052	.052	.052	.052	.052	.051	.049	.05	.052	.05	.046	.043	.042	.042	0.04	.062	.011
3	.042	.042	.04	.04	.039	.039	.041	.046	.05	.053	.056	.058	.059	.059	.06	.06	.058	.055	.051	.05	.051	.048	.046	.039	0.06	.06	.039
4	.034	.028	.031	.031	.03	.027	.027	.028	.028	.029			.028	.028	.029	.031	.03	.032	.034	.034	.031	.03	.028	.034	0.03	.034	.027
5	.034	.032	.031	.03	.027	.027	.026	.028	.029	.031	.032	.034	.034	.035	.037	.039	.036	.035	.036	.036	.036	.036	.034	.022	0.03	.038	.022
6	.014	.017	.006	.006	.005	.005	.029	.033	.034	.035	.037	.036	.036	.037	.037	.038	.039	.037	.035	.025	.018	.009	.003	.001	0.02	.038	.001
7	.002	.003	.004	.003	.001	.005	.016	.021	.031	.039	.043	.046	.048	.046	.05	.052	.049	.046	.04	.034	.025	.018	.017	.018	0.03	.062	.001
8	.019	.019	.019	.021	.022	.025	.034	.046	.056	.061	.065	.066	.067	.067	.067	.068	.067	.066	.064	.057	.043	.035	.047	.055	0.06	.068	.019
9	.054	.052	.05	.05	.051	.054	.06	.064	.066	.071	.072	.074	.076	.075	.076	.082	.087	.081	.07	.068	.064	.053	.04	.037	0.08	.087	.037
10	.038	.046	.046	.046	.046	.045	.046	.051	.058	.064	.067	.077	.087	.093	.097	.091	.086	.085	.082	.08	.075	.062	.048	.047	0.07	.097	.038
11	.052	.049	.045	.045	.043	.04	.038	.039	.042	.045	.05	.057	.063	.066	.062	.057	.058	.058	.055	.053	.047	.046	.044	.038	0.06	.066	.038
12	.033	.031	.043	.042	.037	.039	.035	.03	.03	.032	.034	.033	.03	.029	.033	.037	.038	.04	.039	.035	.027	.02	.017	.013	0.03	.043	.013
13	.01	.007	.004	.003	.001	.017	.02	.026	.031	.032	.036	.038	.038	.039	.041	.039	.037	.037	.035	.032	.03	.022	.014	.01	0.02	.041	.001
14	.008	.005	.003	.009	.005	.027	.033	.036	.044	.048		.051	.055	.061	.064	.066	.066	.071	.07	.062	.057	.056	.051	.035	0.04	.071	.003
15	.025	.018	.014	.021	.047	.035	.038	.049	.061	.057	.059	.066	.075	.087	.106	.108	.105	.1	.096	.101	.096	.085	.074	.073	0.07	.108	.014
16	.061	.05	.075	.079	.069	.06	.056	.057	.059	.063	.064	.052	.053	.06	.065	.069	.083	.079	.071	.056	.04	.034	.042	.052	0.06	.083	.034
17	.048	.045	.036	.038	.037	.029	.032	.037	.046	.05	.051	.052	.054	.058	.058	.058	.054	.053	.048	.05	.05	.048	.046	.047	0.06	.068	.029
18	.045	.048	.043	.043	.046	.041	.038	.036	.04	.047	.056	.057	.057	.056	.058	.059	.057	.056	.055	.055	.056	.057	.055	.054	0.06	.068	.036
19	.051	.046	.041	.037	.035	.034	.037	.043	.051		.059	.062	.067	.061	.071	.078	.064	.057	.054	.05	.049	.049	.048	.048	0.06	.078	.034
20	.046	.043	.039	.039	.038	.039	.042	.044	.049	.053	.054	.054	.053	.052	.049	.052	.055	.058	.054	.054	.055	.053	.052	.052	0.06	.068	.038
21	.05	.047	.042	.038	.043	.044	.052	.05	.048	.043	.044	.049	.052	.056	.056	.052	.054	.056	.052	.046	.043	.04	.038	.035	0.06	.068	.035
22	.032	.03	.025	.024	.021	.021	.026	.034	.042	.047	.051	.05	.053	.056	.057	.055	.054	.052	.047	.041	.035	.025	.014	.01	0.04	.067	.01
23	.006	.004	.018	.016	.01	.014	.036	.042	.044	.04	.044	.044	.046	.048	.051	.053	.055	.054	.049	.046	.038	.039	.034	.028	0.04	.066	.004
24	.033	.032	.025	.025	.017	.017	.028	.032	.049	.055	.059	.062	.068	.071	.07	.067	.069	.064	.045	.039	.038	.037	.036	.034	0.04	.071	.017
25	.034	.033	.029	.029	.028	.026	.026	.028	.029	.03	.03	.029	.028	.028	.027	.027	.027	.027	.028	.028	.024	.019	.018	.016	0.03	.034	.016
26	.012	.01	.004	.001	.001	.004	.021	.025	.028	.032	.035	.039	.038	.037	.038	.042	.042	.04	.039	.038	.034	.03	.022	.019	0.03	.042	.001
27	.015	.01	.018	.019	.012	.02	.029	.038	.05	.062	.066	.069	.07	.078	.082	.086	.087	.08	.076	.074	.066	.057	.056	.055	0.06	.087	.01
28	.059	.064	.06	.059	.053	.048	.048	.061	.07	.074	.078	.082	.088	.094	.092	.093	.093	.094	.091	.071	.048	.045	.039	.036	0.07	.094	.036
29	.029	.025	.021	.02	.02	.025	.032	.037	.043	.052	.054	.054	.058	.063	.074	.071	.073	.064	.058	.056	.046	.049	.051	.046	0.06	.074	.02
30	.043	.042	.042	.04	.037	.038	.041	.047	.051	.055	.057	.067	.084	.08	.081	.079	.078	.078	.078	.083	.079	.076	.07	.053	0.06	.084	.037
Max	.061	.064	.075	.079	.069	.06	.06	.064	.07	.074	.078	.082	.088	.094	.106	.108	.106	.1	.096	.101	.096	.085	.074	.073		.108	
Min	.002	.003	.003	.001	.001	.004	.016	.021	.028	.029	.03	.029	.028	.028	.027	.027	.027	.027	.028	.025	.018	.009	.003	.001			.001

Total # of valid observations: 716   Data Capture Percent for Entire Month: 99.44%

Analyzer/Instrument Model Name	Model No	Serial Number	Method Code	Analysis Method	Removal Date
O3 API 400A ANALYZER	400A	387	087	ULTRA VIOLET ABSORPTION	

Monthly Status Code Report

June   2012

August 22, 2012 6:17 PM

Site:55-079-0085 BAYSIDE   Param: OZONE 44201   POC: 1   Units: 007 PARTS PER MILLION   Duration: 1 HR

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1																								
2																								
3																								
4											IN - 008	IN - 008												
5																								
6																								
7																								
8																								
9																								
10																								
11																								
12																								
13																								
14											IN - 205													
15																								
16																								
17																								
18																								
19									IN - 008															
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22																								
23																								
24																								
25																								
26																								
27																								
28																								
29																								
30																								

Counts: Invalid: 4   Needs Review: 0   Flagged to EPA: 0   Exceptional Event: 0

Continuous Data – Monthly Review (cont.)

- All field operation emails, phone conversation summaries and morning reports are reviewed to verify problems detected during the month have been properly addressed and coded.

- A monthly QA report is generated and distributed.

- Two independent reviews of observation counts, invalid codes, flag codes and expected site parameters are conducted.

- As necessary or by special request, higher level review of data (e.g. graphing, trend analysis, site comparison) may be performed.

- Data is reviewed for proper coding for AQS submittal.

Discrete Data – Review

- Monthly sample summary reports are generated.

- Critical elements are reviewed (e.g. sampling times, volumes, hold times and temperatures).

- Field records and notes from field operators or lab staff are reviewed.

- Necessary invalid codes and flag codes are identified and added.

- Any needed additional descriptions for invalid codes or flag codes are added in comment fields.

Sample Summary Report for PM2.5

Reporting Period: 04/01/2012 to 04/30/2012

LOCATION	FILTER ID	ACTUAL START	VALID ELAPSED TIME	TOTAL ELAPSED TIME	ELAPSED TARE TO START	ELAPSED START TO FINAL	INITIAL WEIGHT (gram)	FINAL WEIGHT (gram)	SAMPLED VOLUME (m3)	CONC (ug/m3)	SAMPLER STATUS	STATUS CODE
550790026				**MILWAUKEE SER DNR HDQRS**								
POC 2	Sampler Serial#: 20317											
	1548491	04/03/2012 00:00:00	24:00	24:00	18.0	8.0	0.397174	0.397375	24	8.3	00000000	
	1548492	04/15/2012 00:00:00	24:00	24:00	30.0	11.0	0.398499	0.398778	24	11.6	00000000	
	1548553	04/27/2012 00:00:00	24:00	24:00	30.0	18.0	0.396853	0.396942	24	3.7	00000000	
Total # of samples:3												
POC 1	Sampler Serial#: 21081											
	1548488	04/03/2012 00:00:00	24:00	24:00	18.0	8.0	0.394167	0.394366	23.9	8.3	00000000	
	1548489	04/09/2012 00:00:00	24:00	24:00	24.0	17.0	0.399741	0.399839	23.9	4.1	00000000	
	1548490	04/15/2012 00:00:00	24:00	24:00	30.0	11.0	0.398129	0.398401	23.9	11.3	00000000	
	1548552	04/21/2012 00:00:00	24:00	24:00	24.0	5.0	0.393169	0.393257	23.9	3.6	00000000	
	1548568	04/27/2012 00:00:00	23:59	23:59	30.0	18.0	0.394139	0.394223	23.9	3.5	00000000	
Total # of samples:5												

Discrete Data – Review (cont.)

- Records for missed samples are manually created and invalidated.

- Data comparisons between collocated filter-based samplers and continuous samplers are reviewed.

- Monthly sample summary reports are re-generated and reviewed again.

- Monthly missing/invalid/flagged data summary reports are reviewed.

Discrete Data – Review (cont.)

- Two independent reviews of observation counts, invalid codes and flag codes are conducted.

- As necessary or by special request, higher level review of data (e.g. graphing, trend analysis, site comparison etc.) may be performed.

- Data is reviewed for proper coding for AQS submittal.

Precision and Accuracy Data – Review

- Monthly, all QC checks are entered into the AQSP&A spreadsheet and reviewed to determine if any problems occurred.

Comments and Questions?

Contact Information

- Grant Hetherington

- Phone: 608-266-1552

- Email: grant.hetherington@wi.gov