

Data Review Using AirVision

Joel Craig

Craig Environmental Consulting

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Presentation Overview

- Set up Logger and AirVision Central
- Level 0 flagging and Data Review
- Level 1 Review
- Level 2 Review

Logger/AirVision Central Set Up

- 8872 Logger
- Modbus acquisition of concentration and meta parameters.
- BAM1020 hourly poll and extraction from data string.
- 8872 polled by AirVision Central once each hour.
- Favorites helpful for commonly used editors/reports.
- Smaller organizations should consider contracting with Agilaire to host AirVision central.

The screenshot displays the AirVision software interface. The top menu bar includes 'Home', 'View', 'Favorites', and 'Data Source Details'. Below the menu is a toolbar with various icons for editing and configuration. The main window is titled 'Data Source Details' and shows a tree view on the left with a hierarchy of data sources: Canebrake, Cantil, Kernville, Mojave, RidgeCrest, PM10 BAM, PM25 BAM, Ridgecrest8872, Average Alarms, and Channels. The 'Channels' folder is expanded, showing a list of channels including WSP_Mech, WDR_Mech, AmbientT, SiteTemp, BarPress, Ozone, T703conc, O3 flow, WSPSonic, WDRSonic, O3LTemp, O3 Ref, O3 STemp, O3 spres, T703GenT, T703PhoT, SIGTmech, SIGTsoni, T703SPre, T703O3Re, T703Flow, PM10, PM10_AT, PM10_RH, PM10_Vol, PM25, PM25_AT, and PM25_RH. The 'Channel:Ozone' configuration window is open, showing the following settings:

- Associated Source: Ridgecrest8872
- Channel Name: Ozone
- Parameter: RidgeCrest : Ozone
- Channel Type: Modbus
- Enable Channel?:
- Channel Number: 6
- Round Precision: [dropdown]
- Scale Factor: 1.0000
- Base Average: Average Interval: 001m
- Store In Database?:
- Extended Average 1: Average Interval: 015m, Store In Database?:
- Extended Average 2: Average Interval: 001h, Store In Database?:

Level 0 Flagging

- Agilaire flags are internal indicators of unusual conditions.
- Null/qualifier codes are the final determination sent to AQS.
- High/Low/Rate of change
- Bad status for Teledyne analyzers.
- ADVP module provides unlimited flagging possibilities.
- Alarms set to send email to appropriate staff.
- AirVision has an automated flag to null system.
- Flags are very useful to focus on in review.
- One Minute Chart review daily or on each site visit.

The screenshot displays the configuration interface for a Level 0 flagging rule. It is divided into several sections:

- Rule Information:**
 - Rule Details:** Rule Name: BAM10 INV, Enabled (checked), Description: Invalidate when B or M flag, Average Interval: 001h, Max Lookback Intervals: 5.
 - Actions:** Site: RidgeCrest, Parameter Template: PM10_CONTIN, Assign Value: (empty), Assign Data Grade: (empty), Apply Null Code: (empty), Clear Null Code: (empty), Apply Qualifier Code: (empty), Clear Qualifier Code: (empty), Apply Flag: < - Logger Invalid, Clear Flag: (empty), Add Annotation: (empty), Category: (empty), Add Log Book Entry: Enabled (checked), Log Book Message: (empty).
 - Send Email:** Subject: (empty), Tag Email Urgent (unchecked), Email Message: (empty).
- Conditions Triggering Rule:**
 - Buttons: Add Condition (+), Delete Condition (-).
 - Condition List:**

Condition Number	Logical Operator to Next
1	OR
2	OR
3	
 - Condition Details:** Condition Number: 1, Comparison Type: Characteristic Flag, Relationship: Contains, Compare: Site: RidgeCrest, Parameter Template: PM10_CONTIN, To: Flag Comparison Type: Flag: M - Maintenance.

General Level 1 Procedure

- Standardized checklist.
- Review documentation, monthly data set.
- Review one-minute Charts.
- Compile and review QC checks, calibrations, and autocal results.
- Research any unclear issues.
- Use Average Data Editor to add null or qualifier.
- Review monthly data set to ensure edits were correct.
- Export to Excel data screening template.
- Pass to Level 2 reviewer.

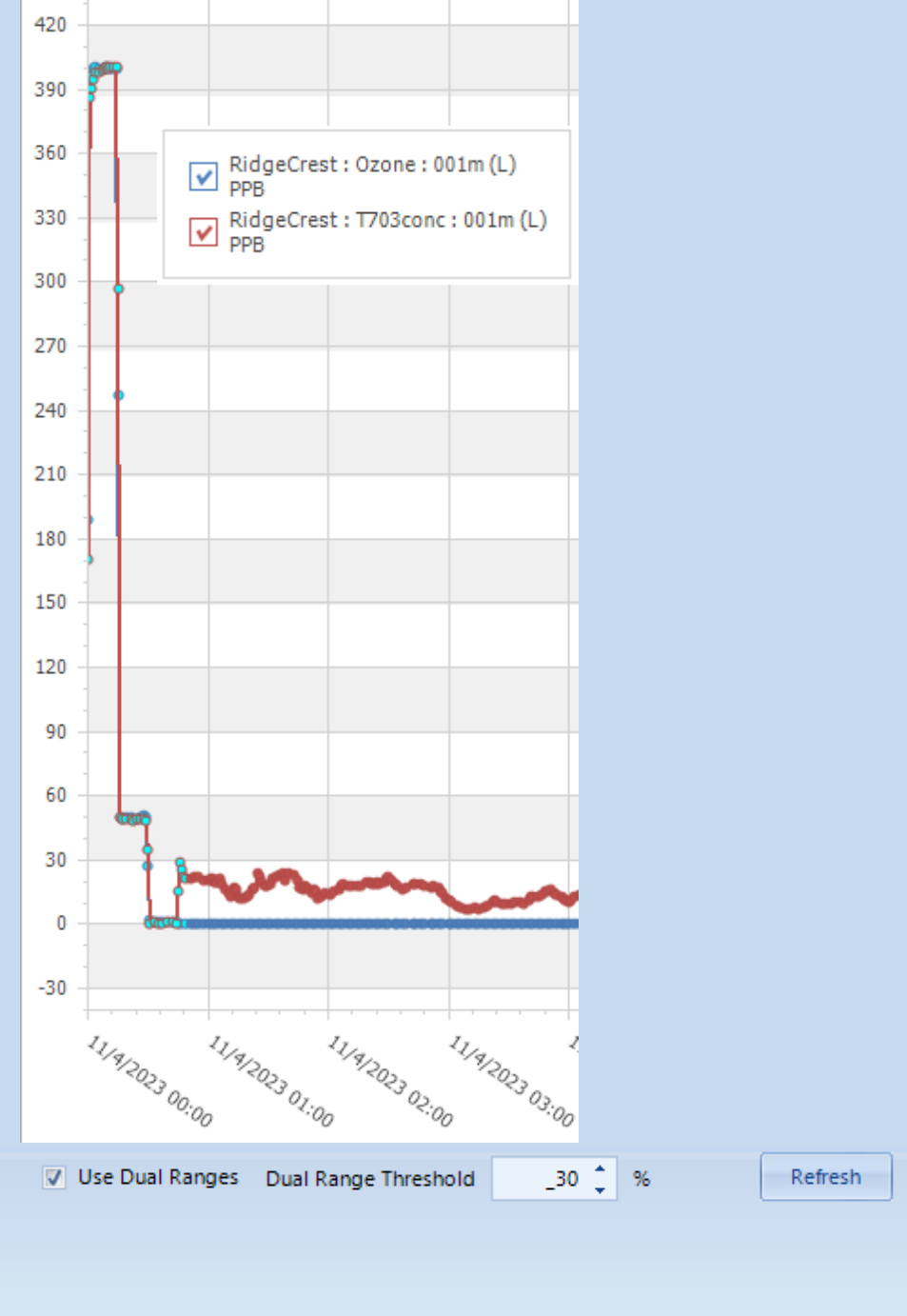
Site	Parameter	Average Interval	Date	Value	Raw Value	AQS Null Code	Flags	Qualifier Codes	AQS Method Code	Data Grade	Annotations
RidgeCrest	PM25	001h	11/09/2023 12:00	-1	-1				170		
RidgeCrest	PM25	001h	11/09/2023 13:00	2	2				170		
RidgeCrest	PM25	001h	11/09/2023 14:00	985	985	AZ	IM<		170		[12/7/2023 09:06][Other Event][jcraig] QC check performed, hour invalid;
RidgeCrest	PM25	001h	11/09/2023 15:00	0	0				170		
RidgeCrest	PM25	001h	11/09/2023 16:00	1	1				170		

Auto-Cal Calculations

- Ozone can automatically set “true” to calibrator photometer value.
- NO₂ true is difficult to automate in AirVision, can be exported to Excel.
- If “One point QC” on sequence is set to “Precision” level, AirVision can generate AQS strings.
- If autocalcs are exported to calculate true, correct true must be hand entered into AirVision.

One Minute Chart Review

- Probably the most important step in the review process.
- Use average data editor, display set to “time series graph”.
- Uncheck “Show invalid as empty” so autocal is visible.



Auto Vs Manual Flag to null

- Difference between Agilare Flag and null code.
- Flag editor (configuration menu) can be used to automatically apply null code based on a flag.
- I apply almost all null codes manually.

Flag	Description	Priority	Invalidates Data	Mapped AQS Null Code	Mapped AIRNow Code	Flag Type	Fore Color	Back Color
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
s	Sample Flow Rate out of Limits	17	<input type="checkbox"/>	AH - Sample Flow R	B - Bad		255, 192,	255, 255,
b	Shelter Temp	18	<input type="checkbox"/>	AE - Shelter Temper			255, 128,	255, 255,
E	Edited	20	<input type="checkbox"/>			Informational Fla	0, 0, 0	223, 255,
f	Floor Limit	21	<input type="checkbox"/>			Informational Fla	0, 0, 0	192, 255,
c	Ceiling Limit	22	<input type="checkbox"/>			Informational Fla	0, 0, 0	255, 192,
z	Zero Adjusted	33	<input type="checkbox"/>				0, 0, 0	255, 192,
Q	Quality Assured	34	<input type="checkbox"/>				0, 0, 0	255, 192,
e	Site Malfunction	35	<input type="checkbox"/>				0, 0, 0	255, 128,
a	Audit	36	<input type="checkbox"/>	AZ - Q C Audit (AU			0, 128, 0	0, 0, 0, 0
p	Precision Check	37	<input type="checkbox"/>	AX - Precision Chec			0, 128, 0	0, 0, 0, 0
o	Other	38	<input type="checkbox"/>				0, 0, 192	0, 0, 0, 0
w	Request Exclusion	39	<input type="checkbox"/>			Validity Flag	255, 0, 0	0, 0, 0
G	Quality Control Check	100	<input type="checkbox"/>			Informational Fla	0, 128, 12	0, 128, 12
r	Repairs	113	<input type="checkbox"/>			Validity Flag	192, 255,	255, 255,
R	Rate of Change Exceeded	114	<input type="checkbox"/>	AN - Machine Malfu	R - Suspect Rate of	Validity Flag	0, 0, 0	255, 0, 25
H	High-High Alarm	115	<input type="checkbox"/>			Informational Fla	128, 0, 12	255, 0, 0
L	Low-Low Alarm	116	<input type="checkbox"/>			Informational Fla	128, 0, 12	255, 255,
h	High Alarm	117	<input type="checkbox"/>			Informational Fla	192, 0, 19	255, 128,
l	Low Alarm	118	<input type="checkbox"/>			Informational Fla	192, 0, 19	255, 255,

Annotation Function

- The best way to document any action taken on the data set or unusual situations.
- Annotation can not be changed once entered. If a mistake was made on entry, make a second annotation to note the error and correct.

Site	Parameter	Average Interval	Date	Value	Raw Value	AQS Null Code	Flags	Qualifier Codes	AQS Method Code	Data Grade	Annotations
LANCASTER	O3 PPB	001h	10/10/2023 15:00	61.4	61.4431247				087		
LANCASTER	O3 PPB	001h	10/10/2023 16:00	51.3	51.3468422				087		
LANCASTER	O3 PPB	001h	10/10/2023 17:00	47.3	47.3702342				087		
LANCASTER	O3 PPB	001h	10/10/2023 18:00	46.5	46.5414486				087		
LANCASTER	O3 PPB	001h	10/10/2023 19:00	44.3	44.3425774		>		087		
LANCASTER	O3 PPB	001h	10/10/2023 20:00	42.9	42.9882237				087		
LANCASTER	O3 PPB	001h	10/10/2023 21:00	41.0	41.0664792				087		
LANCASTER	O3 PPB	001h	10/10/2023 22:00	39.6	39.6682082				087		
LANCASTER	O3 PPB	001h	10/10/2023 23:00			BK	I				[11/2/2023 08:34][Other Event][jcraig] Data logger down, likely due to windows update;
LANCASTER	O3 PPB	001h	10/11/2023 00:00	41.9	41.9308242				087		

Example Data Screening in Excel

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	MAX	45	720	70	80	360.1	102	80	360.1	102	35	500	500	45	0.85	35	100	45	0.685	35
2	MIN	-5	680	-2	-0.1	-0.1	4	-0.1	-0.1	4	20	0	0	-5	0.82	0	0	-5	0.715	0
3	BAD											-4	-4				-5			
4	MAX VALUE	29.5	711.9	58.6	11.3	357.3	84.2	12	359.8	81.2	29.6	131	130	29	0.836	23	15	29.3	0.701	23
5	MIN VALUE	0	0	0	0	0	0	0	0	0	0	-2	-2	-2.2	0	0	-5	-2	0	0
6		ATM	BP	Ozone	MWS	MWD	MSIGT	SWS	SWD	SSIGT	STM	PM10STP	PM10LC	PM10ATM	PM10VOL	PM10RH	PM2.5	PM2.5ATM	PM2.5VOL	PM2.5RH
495	11/21/2023 8:00	AN	711.9	34.3	1.4	251.7	13.2	1.5	246.6	13.3	22	8	8	9.3	0.834	10	2	9.9	0.701	10
496	11/21/2023 9:00	AN	711.9	36.7	0.4	269	62.2	0.4	259.3	59.2	24	8	8	12.8	0.834	9	0	13.6	0.701	9
497	11/21/2023 10:00	AN	711.7	39.4	0.5	164.4	50.6	0.6	161.4	47.9	26.1	5	5	15	0.834	8	1	15.9	0.7	9
498	11/21/2023 11:00	AN	710.9	41.7	1.7	118.8	31.1	1.7	117.3	30.8	28.2	1	1	15.5	0.834	7	-1	16.2	0.7	8
499	11/21/2023 12:00	AN	710.2	43.4	1.2	83.9	30	1.3	82.2	30.3	25.6	AZ	AZ	17	0	7	AZ	0	0	0
500	11/21/2023 13:00	AN	709.6	43.4	1.3	108.7	34.8	1.4	107.6	35	24.5	AT	AT	18.3	0	7	AZ	18.9	0	8
501	11/21/2023 14:00	AN	709.1	43.3	1.1	87.3	29.7	1.2	86.5	30.6	26.1	4	4	18.3	0.834	7	AT	18.8	0	8
502	11/21/2023 15:00	AN	709.2	42.7	0.7	94	32.4	0.8	92.7	33.8	28.7	4	4	17.7	0.834	7	-1	18.3	0.7	7
503	11/21/2023 16:00	AN	709.2	35.8	0.6	91.4	26.8	0.6	89	26.4	27.9	10	10	14.8	0.834	8	0	15.3	0.701	8
504	11/21/2023 17:00	AN	709.3	22.4	0.7	221.3	51.6	0.7	217.1	50.4	28.5	38	38	11.1	0.834	9	5	11.5	0.7	9
505	11/21/2023 18:00	AN	709.4	20.5	3.1	222.2	8.8	3.2	217.8	8	28.4	16	16	7.9	0.834	9	4	8.1	0.701	10
506	11/21/2023 19:00	AN	709.3	17.9	2.8	222.1	4.7	3	217.8	4.2	28.1	16	16	6.5	0.834	10	1	6.7	0.701	10
507	11/21/2023 20:00	AN	709.3	18.9	3.4	238.2	6.5	3.6	233.7	5.9	27.4	20	20	5.3	0.834	10	4	5.5	0.701	10
508	11/21/2023 21:00	AN	709.2	22.5	3.7	226	5.2	3.9	221.7	4.6	26.5	12	12	5.6	0.834	9	4	5.7	0.7	10
509	11/21/2023 22:00	AN	709.1	22.8	3.7	226.6	4.7	3.8	222.3	4.2	25.9	7	8	5	0.834	10	3	5.2	0.701	10
510	11/21/2023 23:00	AN	708.8	19.7	2.9	230.3	4.4	3	225.6	4.1	25.5	5	6	3.3	0.835	10	2	3.5	0.7	11
511	11/22/2023 0:00	AN	708.6	0	3.7	226.8	6.5	3.9	222.6	5.9	25	4	5	3.9	0.835	10	0	4.1	0.701	10
512	11/22/2023 1:00	AN	708.3	22.7	3.6	232.3	4.3	3.8	227.8	3.9	24.4	6	7	3.2	0.834	10	4	3.4	0.701	11
513	11/22/2023 2:00	AN	708.1	21.3	3	231.1	8.2	3.2	226.8	7.8	23.9	5	6	2.1	0.835	11	1	2.3	0.701	11
514	11/22/2023 3:00	AN	707.8	20.9	3	223.2	5.2	3.1	219.1	4.9	23.4	3	4	1.3	0.835	11	-1	1.5	0.701	11
515	11/22/2023 4:00	AN	707.6	20	3	221.5	5.4	3.2	217.3	4.9	22.8	1	2	0.7	0.834	11	2	0.9	0.701	12
516	11/22/2023 5:00	AN	707.5	19.3	2.8	226.6	7.6	2.9	222.3	7.2	22.2	2	3	0.5	0.835	12	3	0.7	0.701	12
517	11/22/2023 6:00	AN	707.5	18	2.3	219.1	7.2	2.3	214.9	6.9	21.8	7	8	-0.4	0.834	12	2	-0.1	0.701	12
518	11/22/2023 7:00	AN	707.6	21.1	2.1	226.2	9.6	2.2	221.9	9.5	21.4	3	4	3.7	0.835	12	0	3.9	0.701	12
519	11/22/2023 8:00	AN	707.5	27.9	1.9	253.6	13.9	2	248.9	13.7	21.9	7	7	8.2	0.835	11	0	8.6	0.701	12
520	11/22/2023 9:00	AN	707.2	32.6	1.1	280	19.5	1.2	275.2	20.8	23.6	7	7	12.1	0.834	10	0	12.6	0.7	11
521	11/22/2023 10:00	AN	706.5	34.5	0.8	293.4	39.2	0.9	288.2	39.8	25.6	5	5	13.9	0.834	9	0	14.8	0.7	10
522	11/22/2023 11:00	AN	705.5	37.7	0.1	109.5	42	0.1	117.6	42.5	27.8	3	3	16.2	0.834	8	-1	17.6	0.7	9
523	11/22/2023 12:00	AN	704.5	38.3	0.6	79.1	63.7	0.7	78.3	64.9	28.1	6	6	17.8	0.834	8	-2	18.9	0.7	8
524	11/22/2023 13:00	AN	703.5	39.1	1.9	81.3	23.9	2	79.2	23.8	28	6	6	18.1	0.835	8	0	18.8	0.7	8

General Level 2 Procedure

Mostly an independent second set of eyes checking Level 1 Work

- Review Documentation.
- Review Monthly Data set, special attention to any data action taken by Level 1 reviewer.
- Review all calibration/QC data, ensure all required tasks performed on time.
- “Buddy site” comparison as needed.
- Any differences with Level 1 must be discussed and consensus reached.

AirVision Tools for Level 2 Review

- Typically, copies of all documentation is included in data packet.
- Use Monthly Report with “show null codes” as a tool to review data set and Level 1 action taken.
- Average data editor review includes annotations explaining any data actions taken.
- Document review should allow confirmation that all QC/calibration tasks were performed in required interval and within allowable tolerance.
- Care with use of “buddy site” comparison.

Resolving Differences With Level 1 Review

- Level 1 and 2 reviewer discuss issue and share their perspective.
- Try to reach consensus.
- Discuss with others if needed to reach consensus.
- Finalize data for Level 3 review when consensus is reached.

Questions?

Contact Information:

Joel Craig

Craig Environmental Consulting

craigairmonitoring@att.net

805-712-5701