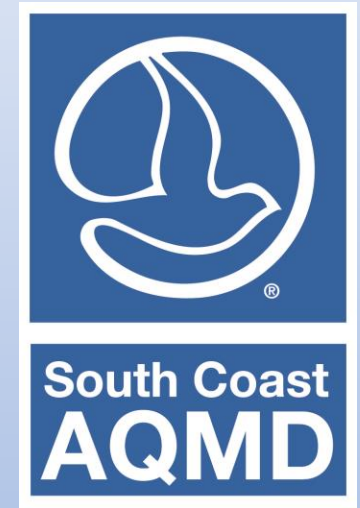


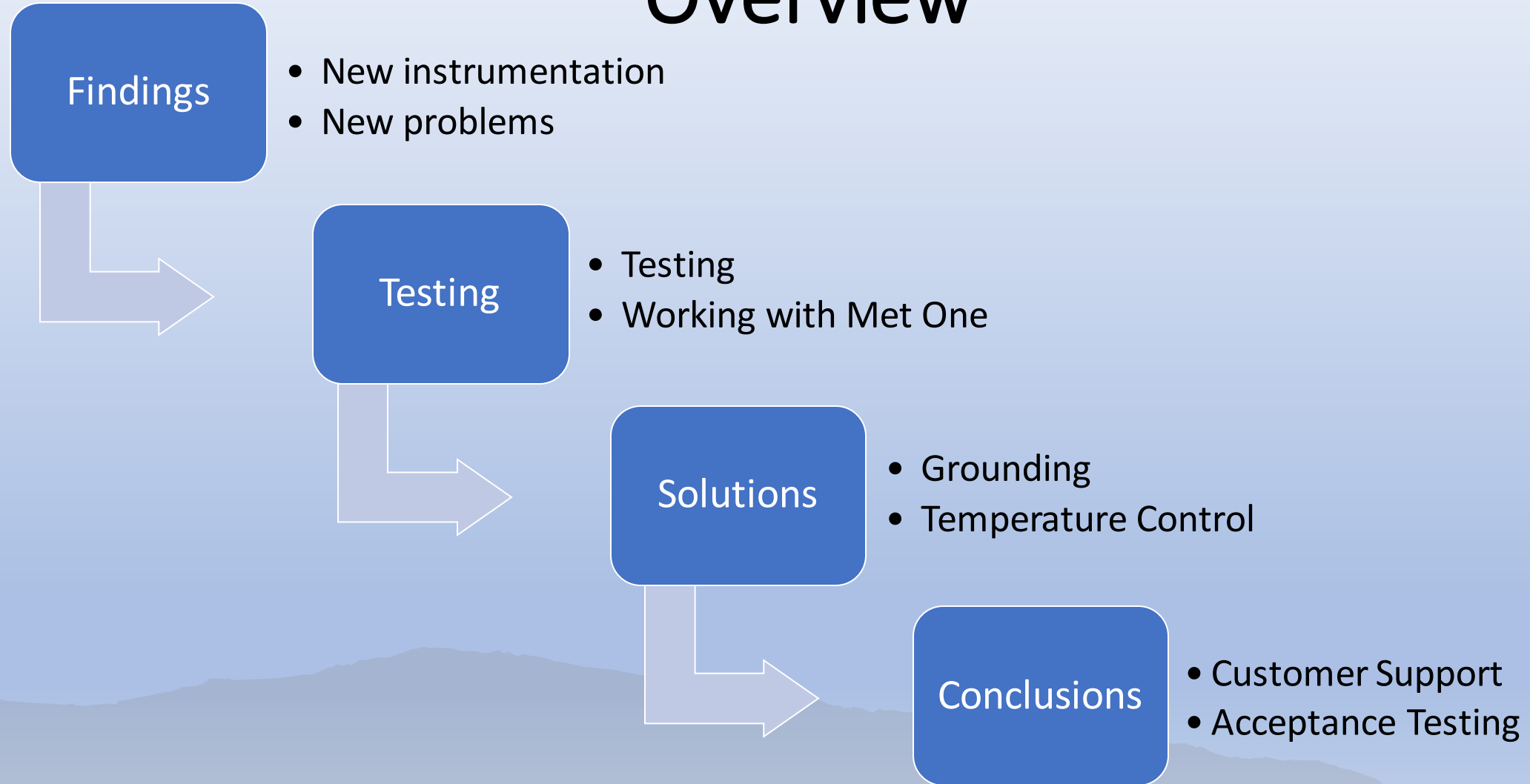
# Gen-3 BAM 1020 Challenges and Resolutions

2024 PQAQO Training  
Feb 27-28, 2024

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# Gen-3 BAM 1020 Overview



# BAM 1020 Gen-3 comments

- First deployed by South Coast AQMD in 2022
- Zero checks are OK at HQ, failed in field
- Caused data loss for South Coast AQMD
- New Power supply unit
  - Possible grounding issues
- New software
  - Heading changes need software update
  - Ethernet dropouts
- Growing Pains with new instrument

Gen 2

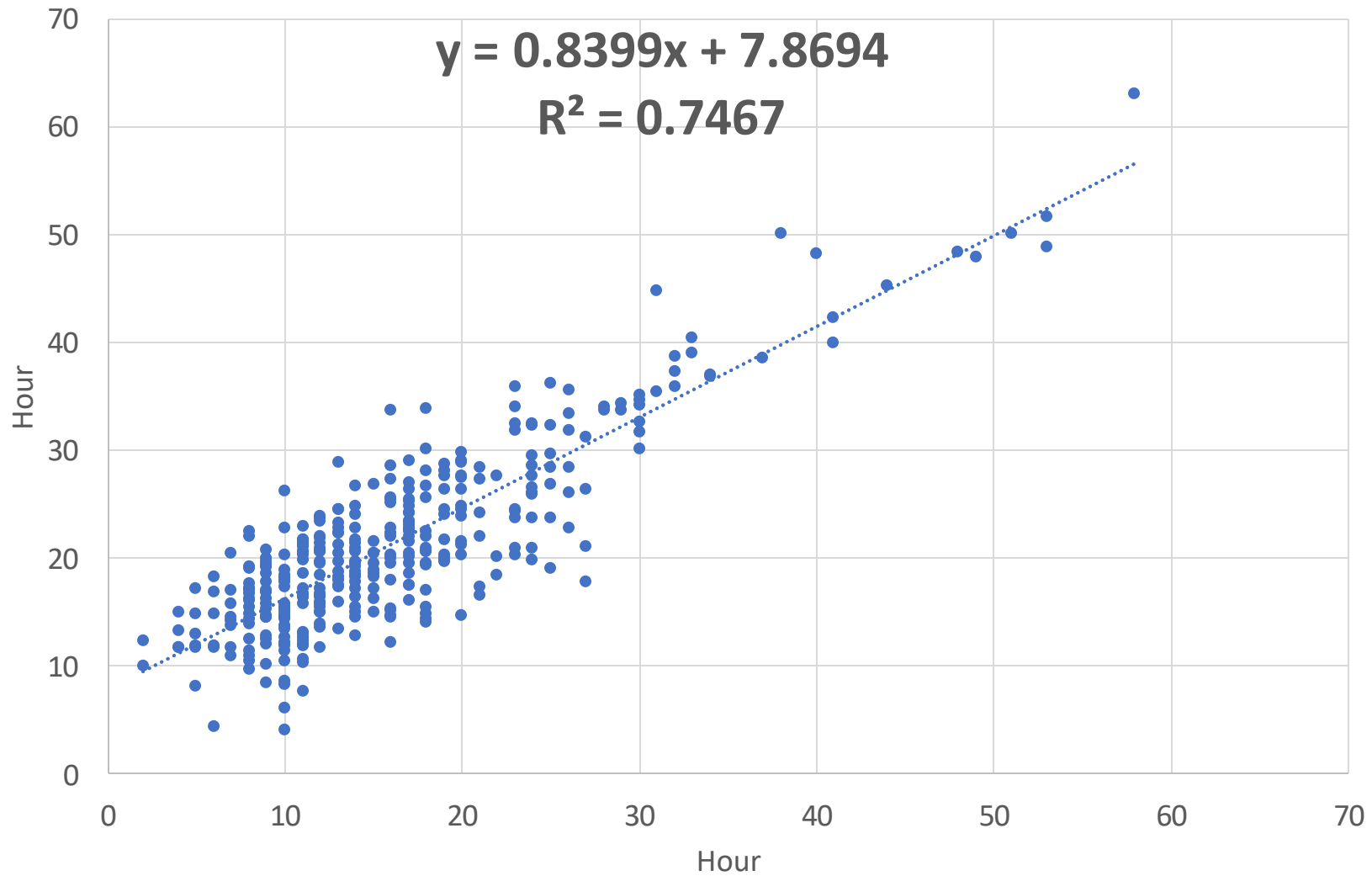


Gen 3



Vs.

## Gen 2 vs Gen 3 Comparison 9/2022



# BAM 1020 Gen-3 solutions

- Worked directly with Met One engineers
- All South Coast AQMD 1020 Gen 3 units sent back to Met One for upgrades and checkout
- Removed paint on grounds within the BAM
- Moved ground wire from pump to earth ground on wall outlet
- Minimize temperature swings of shelter

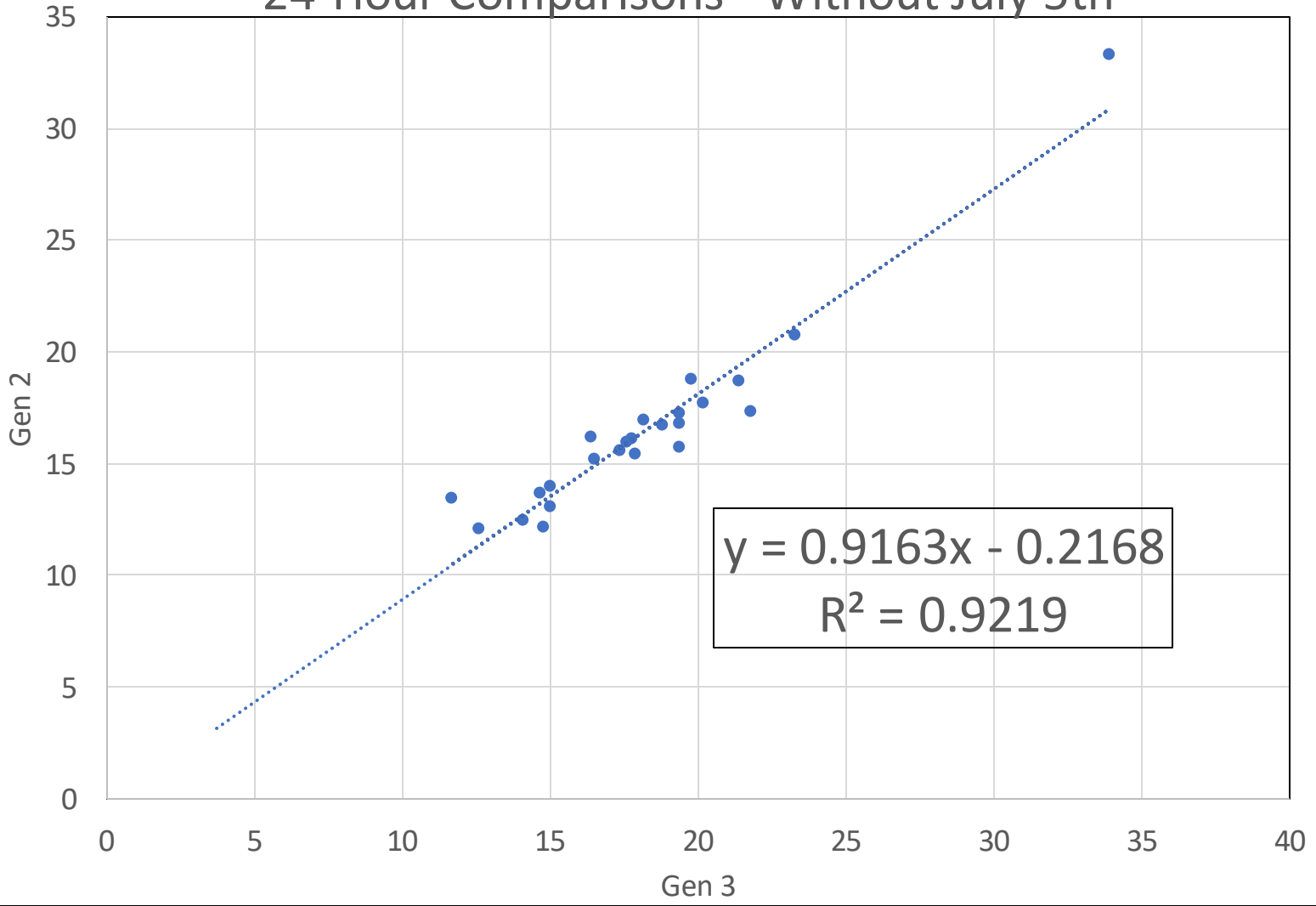


# Met One Comments

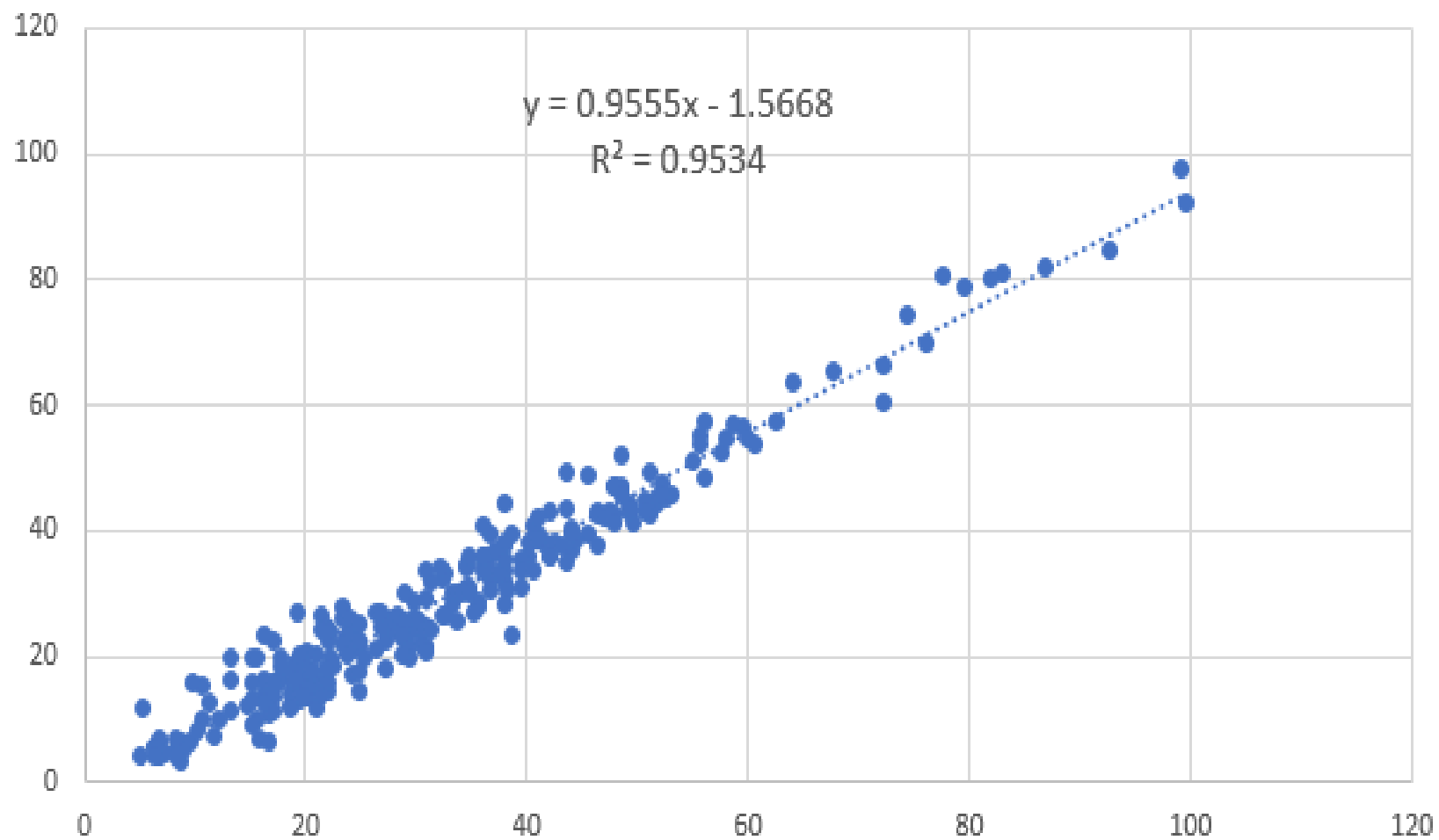
- Met One gave us a list of ~78 improvements to the Gen 3 Bam since its release
- None affect the measurement of the instrument, and most of them are small changes.

65	FRONT FRAME, BAM 1020DC	HOLE ALIGNMENT WAS OFF CAUSING WELDING CHALLENGES. DIMENSIONS CHANGED WAS: .67 IS : .71 WAS: 4X .59 IS: 4X .63
66	DATA PLATE, CFR COMPLIANCE BAM 1020	THIS IS A DRAWING CHANGE ONLY COMPONENTS ALREADY ARRIVE TO THIS DRAWING. DRAWING WAS NEED TO BE DRAWN INTO CURRENT CAD SYSTEM. CHANGED MATERIAL WAS: PLATED BRASS IS: .029" SATIN SILVER STAINLESS STEEL WITH 3" GRAIN.
67	BUSHING, NOZZLE	CHANGED OUTSIDE DIAMETER DIMENSION RANGE FROM .7505 - .7510 TO .753 - .752. THIS LARGER OUTSIDE DIAMETER HELPS THE MACHINE SHOP PRESS FIT THE PART INTO THE 8096.
68	SHAFT, PIVOT	ADDED WRENCH FLATS 7/16" (.44 - .43 FLAT) TO AID IN ASSEMBLY. THIS WAS A REQUEST THAT CAME FROM INDIA BAM ASSEMBLY, THEY WERE HAVING CHALLENGES GRIPPING THIS PART FOR INSTALLATION.
69	BAM 1020 "N" MAIN CHASSIS ASSEMBLY PROCEDURE	Added tubing length, pg. 15 and fixed typos
70	FRONT FRAME, BAM 1020 DC	CORRECT DIMENSION ON 4-40 HOLES WAS: .73 IS: .81. CORRECTION IS TO MATCH CURRENT PART IN MANUFACTURING. CHANGED TOLERANCE ON DIMENSION 16.83 WAS: STANDARD TOLERANCE IS: 16.83 +.01/-00 THIS IS A DRAWING CORRECTION ONLY.
71	PLATE, RELAY HEATER CONTROL	COMPONENT CLEARANCE, REMOVE ANGLE ON ONE LEG
72	REAR PANEL, BAM 1020 DC	CHANGE MASKING AREA AROUND POWER CONNECTOR. WAS 7/8" DIA. IS 1.00 DIA.
73	MOUNTING BRACKET, PHOTO INTERRUPTER ARRAY	CHANGED TWO MOUNTING HOLES (DIAMETER .120") TO SLOTS (.060 RAD X .080), SO PRODUCTION CAN ADJUST THE PHOTO SENSOR WHEN MOUNTING IT
74	OPTO-SENSOR HARNESS ASSY	Added single crimp wire to J5 to improve connection reliability
75	OVERLAY, BAM 1020, ACOEM	NEW REBRANDED BAM 1020 OVERLAY. THIS OVERLAY WILL REPLACE THE CURRENT SILKSCREEN USED ON THE DOOR OF THE BAM 1020. ADD 84155 TO "BAM 1020".
76	DOOR, BAM 1020 DC	Silkscreen removed.
77	BAM 1020 (83440) Firmware	9.4.5 Production firmware release <ul style="list-style-type: none"> <li>Updated GFX_KbdNoritake.c to fix a bug with the lower case keyboard "OK" and "Cancel" button along with reducing space between keys for improved performance.</li> <li>Added fix for allowing CCS Modem polls to not interfere with standard report output or USB transfers.</li> </ul> 9.4.4 Field release <ul style="list-style-type: none"> <li>Integration of multi display support. (Reach and Noritake)</li> <li>Added compile switch for running the unit as a Standard. It makes it so OI will output on the RS232 port instead of the RS485. India/Grants Pass specific as (-3)</li> </ul> 9.4.3 Field release <ul style="list-style-type: none"> <li>Adding compile switch (-7) for EU version which sends out the Reference and Stability measurements. Added to CSV for normal and legacy as well as BH protocol. Update DS and XRD commands accordingly.</li> </ul> R9.4.2 Field release to a few customers for testing. <ul style="list-style-type: none"> <li>Added Ethernet Timeout to help customers that have clients that connect without releasing their connection correctly.</li> <li>Only do the EVT UTC if we are in Course Slave mode to avoid issues with the CCS Modem.</li> </ul> R9.4.1 Field release to Thailand distributor. <ul style="list-style-type: none"> <li>Chinese translation fixes reported by Gemini.</li> <li>On startup, suppress "Missing AT Sensor" message on gOperate screen until usLoggerReady is set.</li> <li>Changed analog output 2 from Conc to ConS for Thailand distributor and be aligned with the manual.</li> <li>Added DISABLE_NOZZLE_DOWN to opNormal operation. Used to measure the affects of tape movement detection limit.</li> <li>Added SetNozState() function to assist with tape movement test.</li> <li>Fixed incorrect enum used for Internal RH Failure.</li> <li>Change analog output 2 from Conc to ConC for Thailand distributor and be aligned with manual.</li> </ul> R9.4.0 Field release with 63908 special Tadchen <ul style="list-style-type: none"> <li>Adding BX-Coarse slave support</li> <li>Changed the GPIO speed of the SPI2 device to improve noise immunity of the A/D measurements.</li> <li>Changed RH and FRH precision from xxx to xxx.x as well as Cal FRH.</li> <li>Turn off HV when doing the FLASH command to avoid possible false invocation of boot loader from beta counts.</li> <li>Changed RH and FRH precision from xxx to xxx.x. Changed Cal FRH standard precision to xxx.x.</li> </ul> R9.3.2 Field release <ul style="list-style-type: none"> <li>Added GEN 2 1-command Current Day report</li> </ul> R9.3.1 Field release Fixed GEN 2 control with beta to beta in beta command to match the file 64 and 63
78		
79		

# 60NR Gen2 vs. Gen3 PM2.5 7/2/23 to 7/25/23 24-Hour Comparisons - Without July 5th

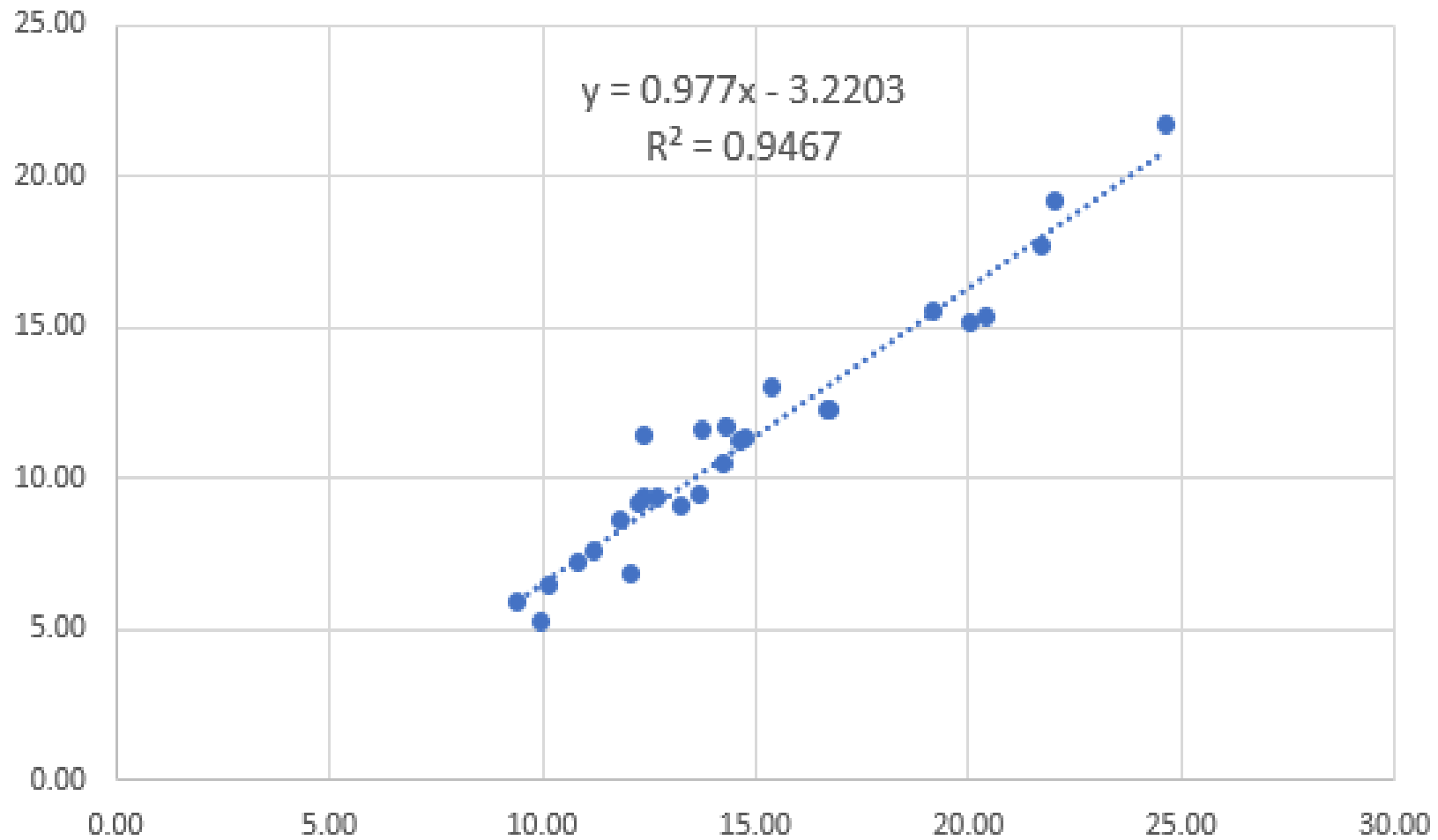


RIVR Gen3 DN11579 vs Gen2 M13999 8-25-23 to 9-5-23  
PM10 hourly average



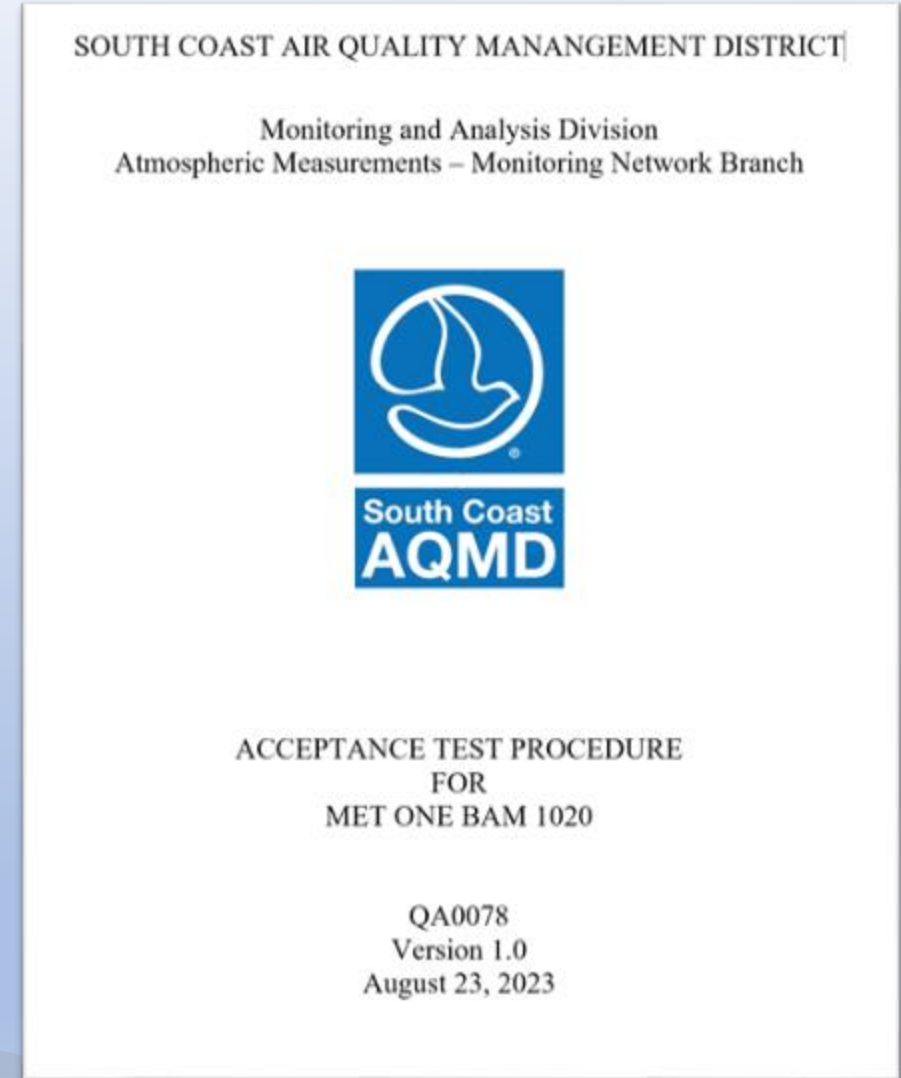


W710 gen3 DN11584 vs gen2 F8025 daily PM2.5 average  
8-10-23 to 9-4-23

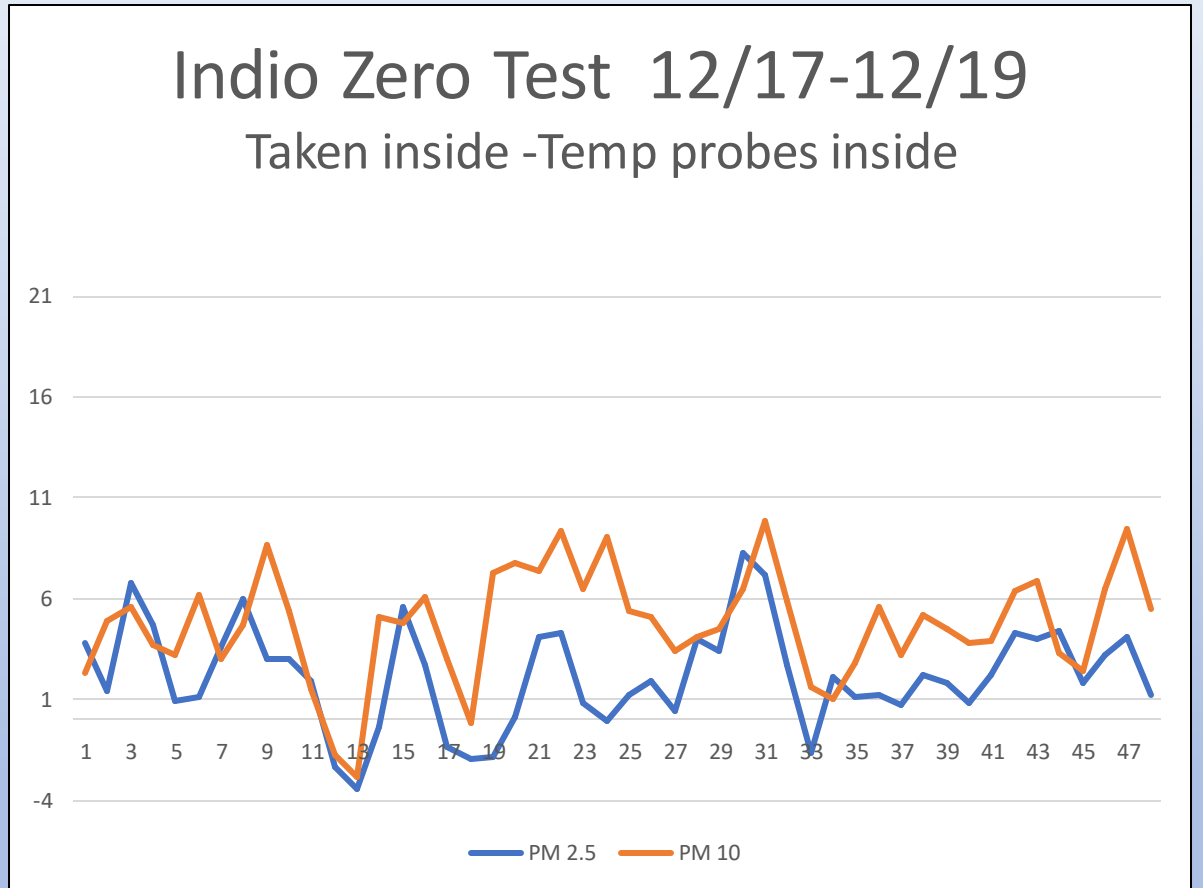
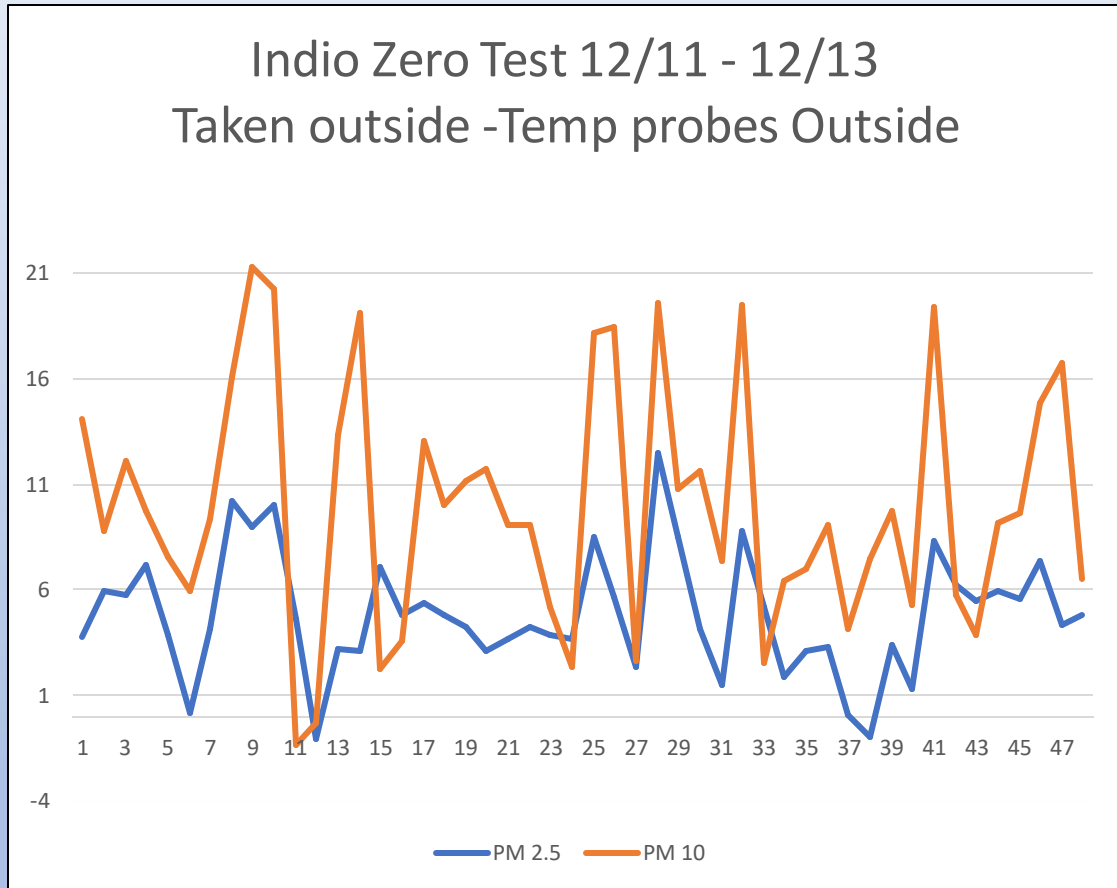


# BAM 1020 Acceptance Testing

- Formalized Acceptance Testing for the BAM 1020
- In house testing at South Coast AQMD
- Field Testing
  - Collocation testing at specific stations
  - Background testing
- Final deployment to air monitoring station



# Background Testing Outside vs Inside



# BAM 1020 Gen-3 conclusions

- No singular smoking gun
- Originally thought to be ground issues
  - Recent testing proved otherwise
- Temperature control is extremely important
- Multiple improvements made the units pass specifications
- Ensure latest software has been installed
- Met One has been, and continues to work closely with South Coast AQMD Staff
- Be the squeaky wheel!



# Questions?



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