71.4%	12/14/2024 4:...	BH-02 Louvre t...	14291821	Differential Pre...	in w.g	0.31	1.
74.8%	12/14/2024 4:...	Scapeway Rais...	14090870	Airflow Volume	kcfm	1.05	
12.3%	12/14/2024 4:...	1245mL - Main ...	13853623	Airflow Volume	kcfm	104.19	118
107.1%	12/14/2024 4:...	1245mL - Main ...	13854575	Airflow Volume	kcfm	104.16	50
112.4%	12/14/2024 4:...	1245mL - Main ...	13853654	Airflow Volume	kcfm	60.12	28
56.9%	12/14/2024 4:...	1245mL Vent D...	13849234	Differential Pre...	in w.g	1.58	1.
383.3%	12/14/2024 4:...	1245mL Vent D...	13849234	Airflow Volume	kcfm	43.98	9
238.3%	12/14/2024 4:...	1245mL Vent D...	13849234	Airflow Volume	kcfm	43.98	
219.2%	12/14/2024 4:...	1245mL Vent D...	13849234	Differential Pre...	in w.g	1.58	
211.7%	12/14/2024 4:...	Vent Door Sha...	13932764	Differential Pre...	in w.g	1.52	0.
17.5%	12/14/2024 4:...	1220mL Trans ...	13855712	Airflow Volume	kcfm	23.1	
92.9%	12/14/2024 4:...	1220mL Crush...	13856776	Airflow Volume	kcfm	3.09	43
14.7%	12/14/2024 4:...	1195-1220 Mai...	13854055	Airflow Volume	kcfm	260.12	226
99.2%	12/14/2024 4:...	1220mL Crush...	13855054	Airflow Volume	kcfm	0.33	41
4.6%	12/14/2024 4:...	1195-1220 Mai...	13853739	Airflow Volume	kcfm	261.97	274
29.1%	12/14/2024 4:...	1080 Vent Doo...	14234200	Differential Pre...	in w.g	0.84	1.
11.2%	12/14/2024 4:...	1080 Vent Doo...	14246343	Differential Pre...	in w.g	0.84	0.
107.2%	12/14/2024 4:...	280 Hoist Access	13855231	Airflow Volume	kcfm	42.27	20
7.2%	12/14/2024 4:...	280-965 VR Ac...	14650828	Airflow Volume	kcfm	298.33	321

VentLOG: Introduction and Case Studies Implementation at Multiple Sites

John Bowling, Principal Consultant (Mine Ventilation)

Ventsim User Conference, Brisbane, 11 Mar 2025

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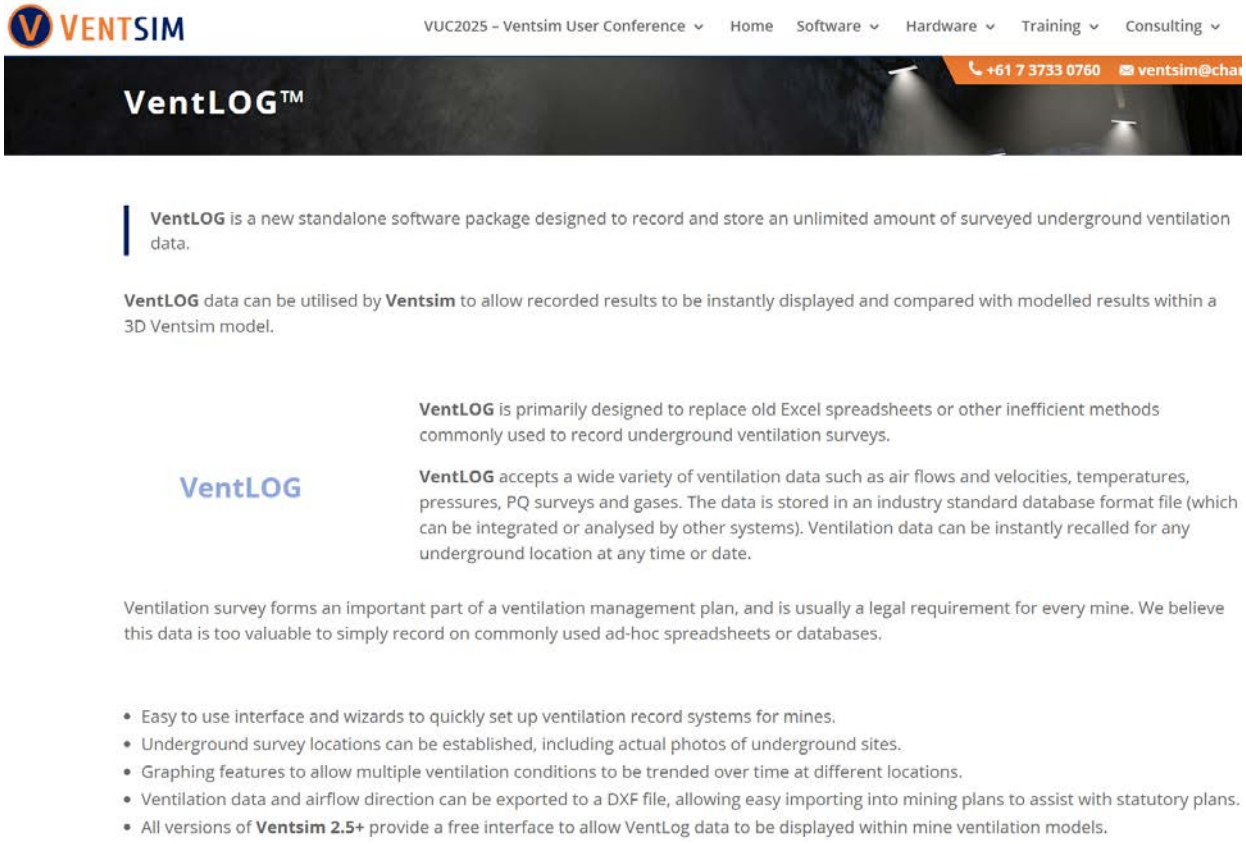
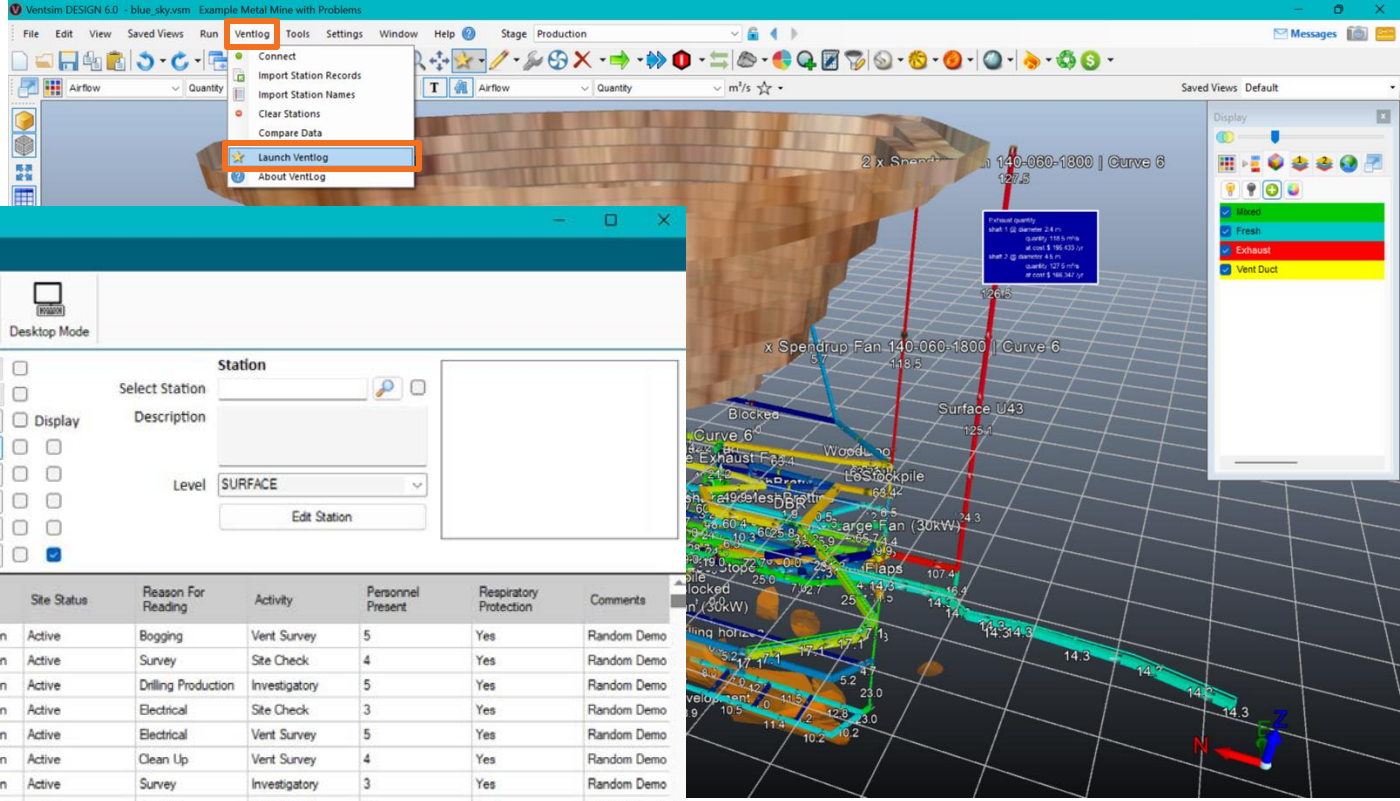
What is VentLOG?

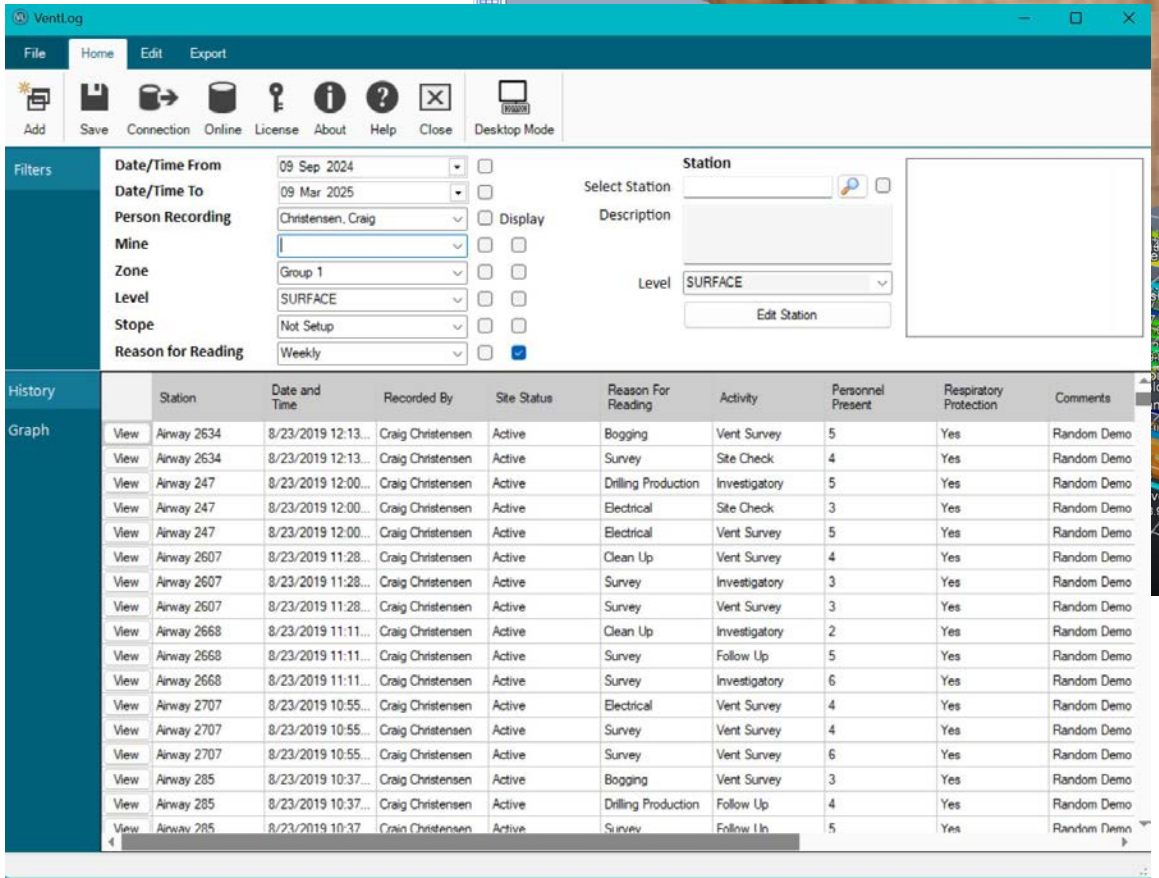
Ventsim-compatible vent survey records storage

- Direct representation in Ventsim
- Export ventilation measurements and arrows to mine maps
- Graphical comparison of records



VentLOG





	Station	Date and Time	Recorded By	Site Status	Reason For Reading	Activity	Personnel Present	Respiratory Protection	Comments
View	Airway 2634	8/23/2019 12:13...	Craig Christensen	Active	Bogging	Vent Survey	5	Yes	Random Demo
View	Airway 2634	8/23/2019 12:13...	Craig Christensen	Active	Survey	Site Check	4	Yes	Random Demo
View	Airway 247	8/23/2019 12:00...	Craig Christensen	Active	Drilling Production	Investigatory	5	Yes	Random Demo
View	Airway 247	8/23/2019 12:00...	Craig Christensen	Active	Electrical	Site Check	3	Yes	Random Demo
View	Airway 247	8/23/2019 12:00...	Craig Christensen	Active	Electrical	Vent Survey	5	Yes	Random Demo
View	Airway 2607	8/23/2019 11:28...	Craig Christensen	Active	Clean Up	Vent Survey	4	Yes	Random Demo
View	Airway 2607	8/23/2019 11:28...	Craig Christensen	Active	Survey	Investigatory	3	Yes	Random Demo
View	Airway 2607	8/23/2019 11:28...	Craig Christensen	Active	Survey	Vent Survey	3	Yes	Random Demo
View	Airway 2668	8/23/2019 11:11...	Craig Christensen	Active	Clean Up	Investigatory	2	Yes	Random Demo
View	Airway 2668	8/23/2019 11:11...	Craig Christensen	Active	Survey	Follow Up	5	Yes	Random Demo
View	Airway 2668	8/23/2019 11:11...	Craig Christensen	Active	Survey	Investigatory	6	Yes	Random Demo
View	Airway 2707	8/23/2019 10:55...	Craig Christensen	Active	Electrical	Vent Survey	4	Yes	Random Demo
View	Airway 2707	8/23/2019 10:55...	Craig Christensen	Active	Survey	Vent Survey	4	Yes	Random Demo
View	Airway 2707	8/23/2019 10:55...	Craig Christensen	Active	Survey	Vent Survey	6	Yes	Random Demo
View	Airway 285	8/23/2019 10:37...	Craig Christensen	Active	Bogging	Vent Survey	3	Yes	Random Demo
View	Airway 285	8/23/2019 10:37...	Craig Christensen	Active	Drilling Production	Follow Up	4	Yes	Random Demo
View	Airway 285	8/23/2019 10:37...	Craig Christensen	Active	Survey	Follow Up	5	Yes	Random Demo

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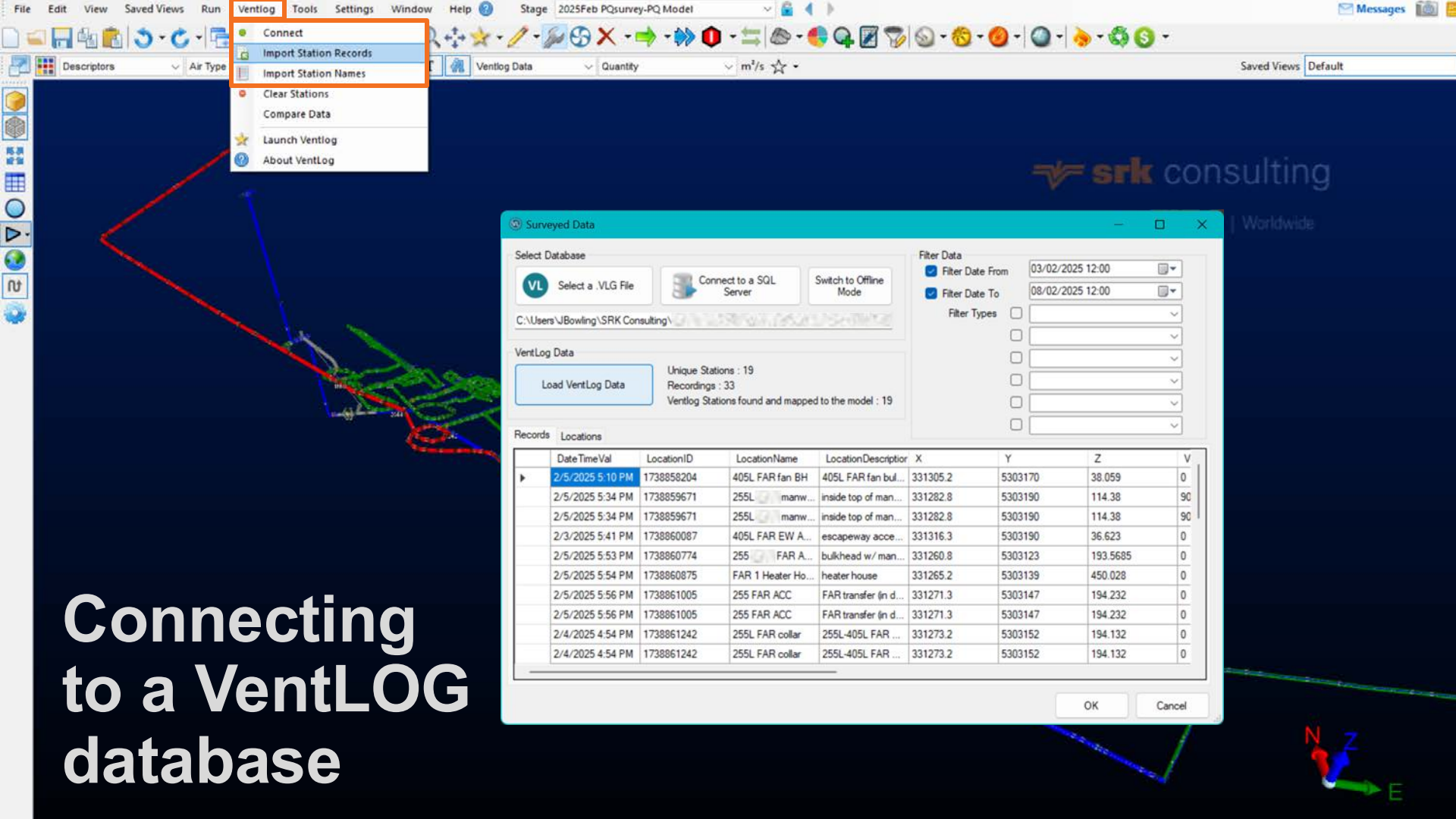

Connecting to a VentLOG database


File
Edit
View
Saved Views
Run
Ventlog
Tools
Settings
Window
Help
Stage
2025Feb PQsurvey-PQ Model
Messages
Descriptors
Air Type Number
Ventlog Data
Quantity
m³/s
Saved Views
Default
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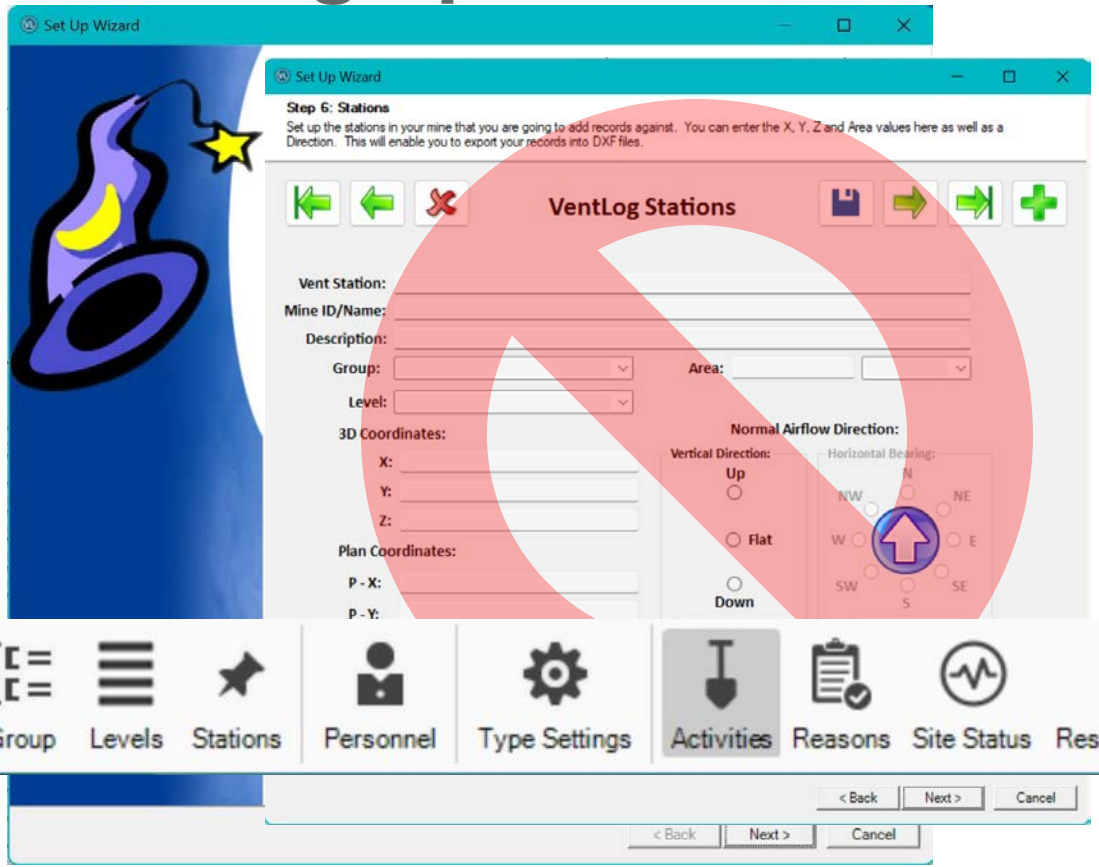
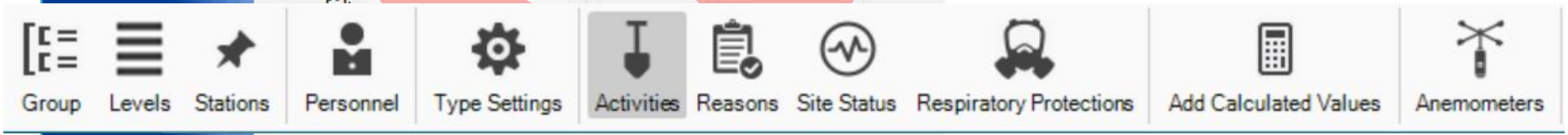
Resourceful | Experienced | Worldwide
Toggle VentLOG data boxes off
Connecting to a VentLOG database
N
Z
E

Setting up VentLOG





Want to set up VentLOG?

- Follow the Wizard!
- Complete the prompts
- Skip station setup
- Change defaults to suit *your* needs!

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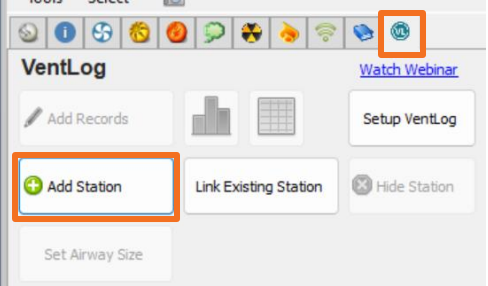
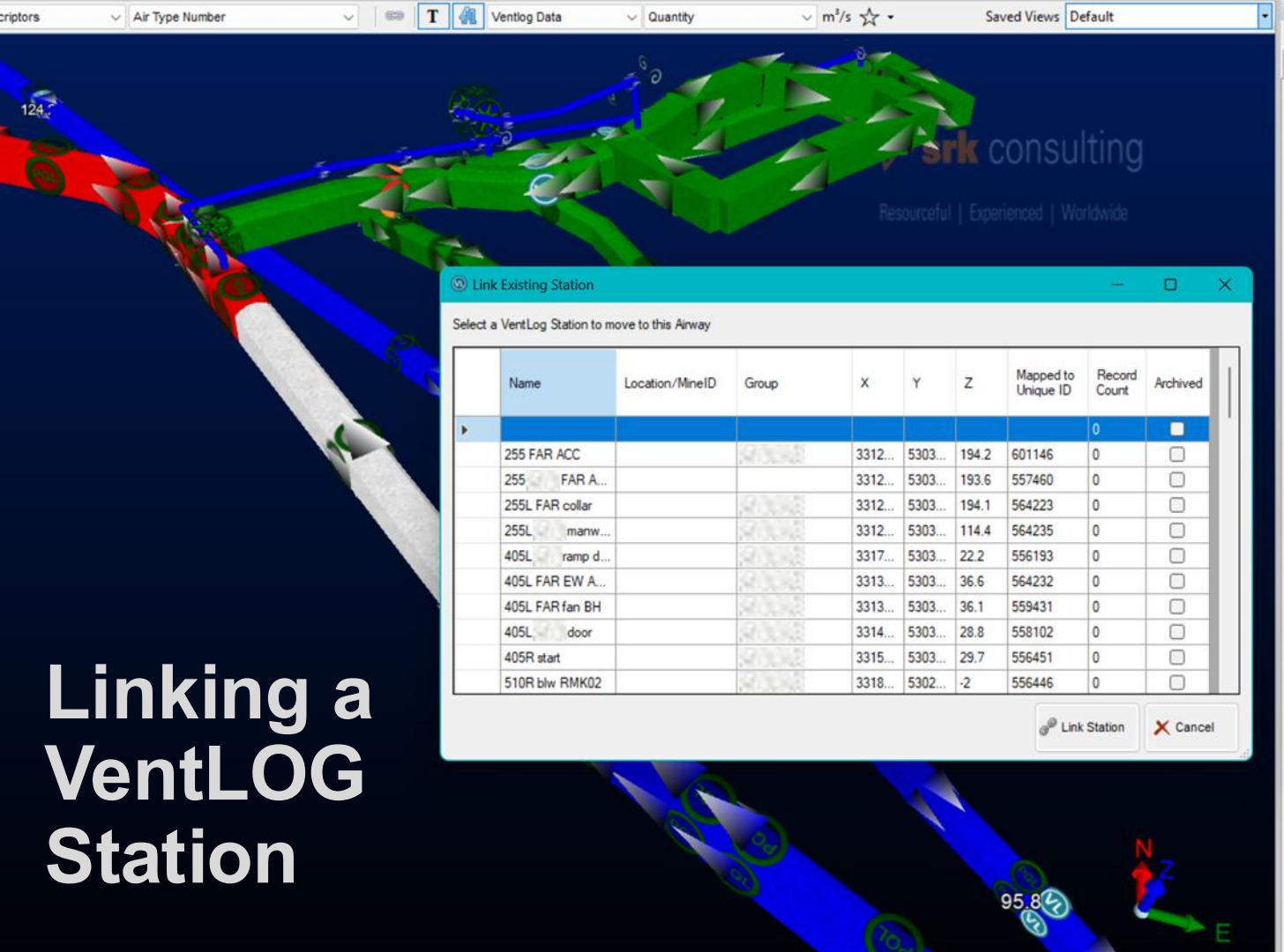
Adding a VentLOG Station

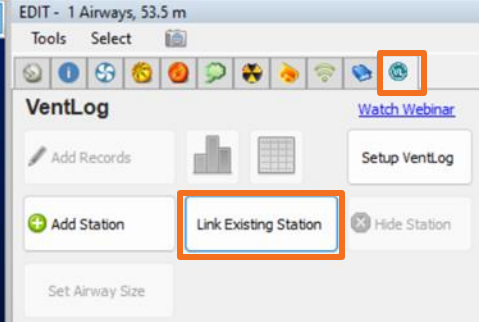


Add Station in Airway Edit Box

- Location and arrow direction from airway
- Area from airway*



Linking a VentLOG Station



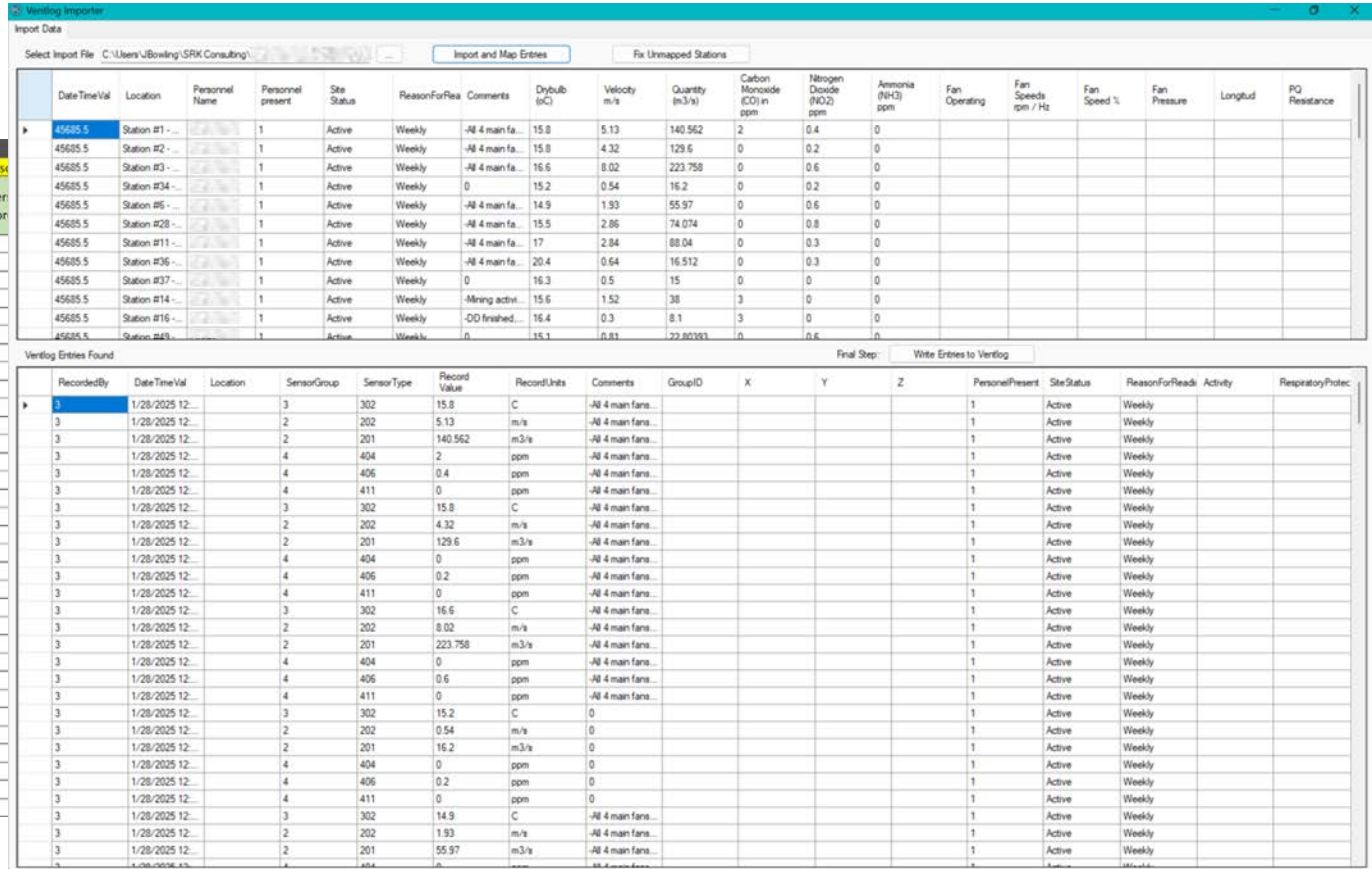
Link Existing Station in Airway Edit Box

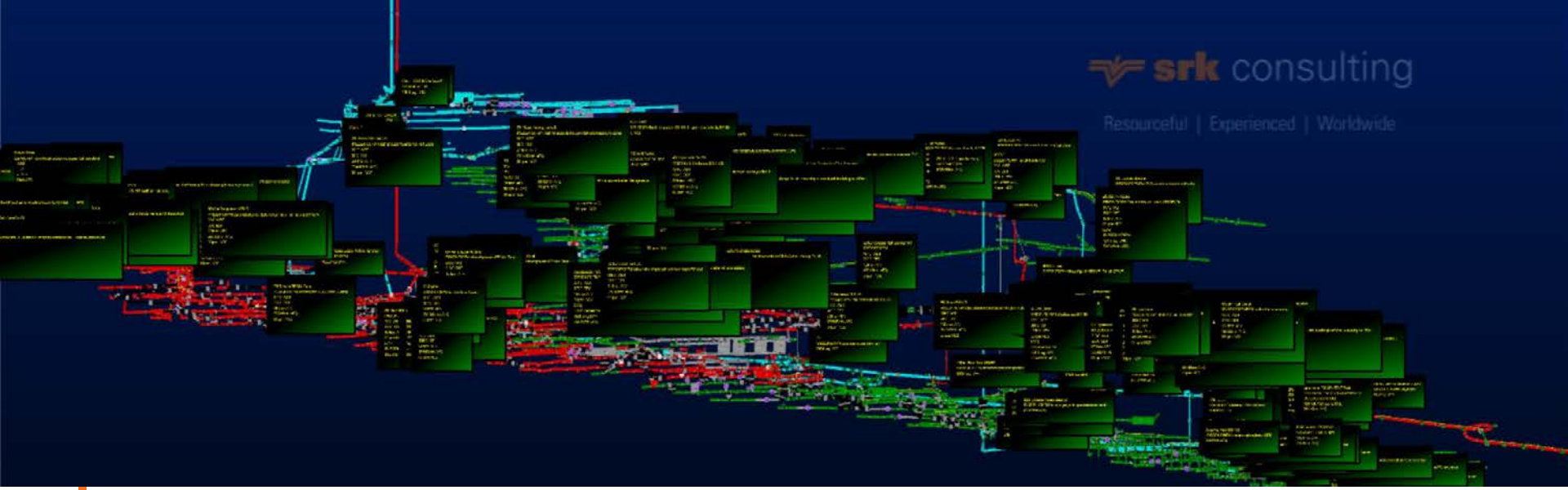
- Location and arrow direction from airway
- Area from airway*

VentLOG Importer Tool

- Standalone tool

B	C	D	E
	DateTimeVal	Location	RecordedBy
	DateTimeVal	Location	Personnel Name
1/0/1900	28/01/2025 12:00:00	Station #1 - Remuck #3	
1/0/1900	28/01/2025 12:00:00	Station #2 - 300	
1/0/1900	28/01/2025 12:00:00	Station #3 - 405 FAR	
1/0/1900	28/01/2025 12:00:00	Station #34 - 105 Storage	
1/0/1900	28/01/2025 12:00:00	Station #6 - 300R	
1/0/1900	28/01/2025 12:00:00	Station #28 - 420R	
1/0/1900	28/01/2025 12:00:00	Station #11 - 300R	
1/0/1900	28/01/2025 12:00:00	Station #36 - 405R	
1/0/1900	28/01/2025 12:00:00	Station #37 - 300L Central Storage	
1/0/1900	28/01/2025 12:00:00	Station #14 - 240L	
1/0/1900	28/01/2025 12:00:00	Station #16 - 270L Incline DDH	
1/0/1900	28/01/2025 12:00:00	Station #49 - 255L	
1/0/1900	28/01/2025 12:00:00	Station #50 - 270L	
1/0/1900	28/01/2025 12:00:00	Station #18 - 285L	
1/0/1900	28/01/2025 12:00:00	Station #19 - 300L	
1/0/1900	28/01/2025 12:00:00	Station #20 - 315L	
1/0/1900	28/01/2025 12:00:00	Station #21 - 330L	
1/0/1900	28/01/2025 12:00:00	Station #22 - 345L	
1/0/1900	28/01/2025 12:00:00	Station #23 - 360L	
1/0/1900	28/01/2025 12:00:00	Station #24 - 375L WEZ	
1/0/1900	28/01/2025 12:00:00	Station #25 - 390L WEZ	
1/0/1900	28/01/2025 12:00:00	Station #27 - 420L WEZ	
1/0/1900	28/01/2025 12:00:00	Station #38 - 510L ALL ACC 01E	
1/0/1900	28/01/2025 12:00:00	Station #54 - 510L ALL ACC 01W	
1/0/1900	28/01/2025 12:00:00	Station #45 - 585R	
1/0/1900	28/01/2025 12:00:00	Station #30 - 300L CEZ	
1/0/1900	28/01/2025 12:00:00	Station #31 - 315L CEZ	
1/0/1900	28/01/2025 12:00:00	Station #32 - 330L CEZ	
1/0/1900	28/01/2025 12:00:00	Station #40 - 345L CEZ	
1/0/1900	28/01/2025 12:00:00	Station #33 - 360L CEZ	
1/0/1900	28/01/2025 12:00:00	Station #39 - 360 CEZ Shop	
1/0/1900	28/01/2025 12:00:00	Station #41 - 375L CEZ	





Using VentLOG

PQ survey workflows based in experience

Office | Onsite | In Mine

PQ Survey Workflow (Traditional)

1. 
   Review model. Create schematic from Ventsim (print out)
2. 
   Plan PQ survey measurements
3. 
   Conduct PQ survey: Record data in field
4. 
   Reduce airflow and barometer survey data

All data recorded in field books or on maps

Reference maps, field books, memory

5. 
   Populate schematic w/ PQ data

Requires field maps, laptop, and schematic

6. 
   Balance PQ data (Kirchoff's Laws)
7. 
   Enter PQ data into model
8. 
   Run model and correlate

Office | Onsite | In Mine

Recommended workflow w/ VentLOG

1. 
   Review model. Create schematic from Ventsim.

2. 
   Plan PQ survey measurements: Create VentLOG stations

3. 
   Conduct PQ survey: Record data in field

   w/ tablet into VentLOG* OR on paper as usual

4. 
   Reduce pressure survey data

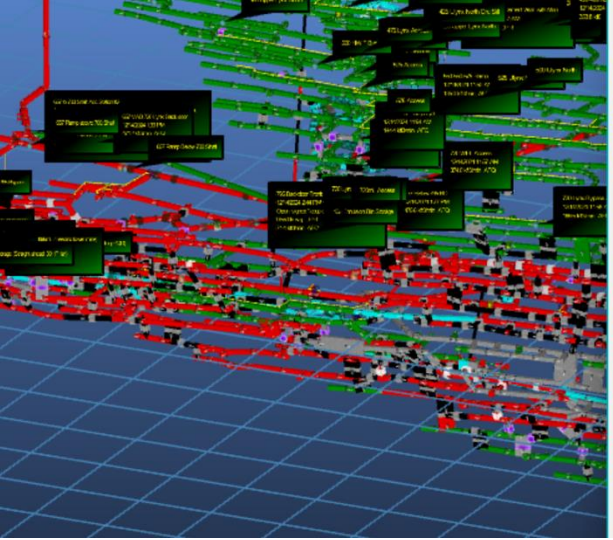
5. 
   Print schematic w/ P*Q data

   Print with airfows, DPs

6. 
   Balance PQ data (Kirchoff's Laws)

7. 
   Update balanced PQ data in model

8. 
   Run model and correlate



Drag a column header here to group by that column

% Diff	Date - Time	Station Name	Airway Number	Find	Record Type	Units	Simulated	VentLog	Comments	Difference
39.5%	12/14/2024 4:...	BH-02 Louvre t...	14291821		Airflow Volume	kcfm	42.71	70.6	60% open	27.89
71.4%	12/14/2024 4:...	BH-02 Louvre t...	14291821		Differential Pre...	in w.g	0.31	1.08	60% open	0.77
74.8%	12/14/2024 4:...	Scapeway Rais...	14090870		Airflow Volume	kcfm	1.05	0.6	pressure drop ...	-0.45
12.3%	12/14/2024 4:...	1245mL - Main ...	13853623		Airflow Volume	kcfm	104.19	118.8		14.61
107.1%	12/14/2024 4:...	1245mL - Main ...	13854575		Airflow Volume	kcfm	104.16	50.3		-53.86
112.4%	12/14/2024 4:...	1245mL - Main ...	13853654		Airflow Volume	kcfm	60.12	28.3		-31.82
238.3%	12/14/2024 4:...	1245mL Vent D...	13849234		Airflow Volume	kcfm	43.98	13	Alt. Scenario (...	-30.98
56.9%	12/14/2024 4:...	1245mL Vent D...	13849234		Differential Pre...	in w.g	1.58	1.01	Alt. Scenario (...	-0.57
383.3%	12/14/2024 4:...	1245mL Vent D...	13849234		Airflow Volume	kcfm	43.98	9.1	Alt. Scenario (...	-34.88
219.2%	12/14/2024 4:...	1245mL Vent D...	13849234		Differential Pre...	in w.g	1.58	0.5	Alt. Scenario (...	-1.09
211.7%	12/14/2024 4:...	Vent Door Sha...	13932764		Differential Pre...	in w.g	1.52	0.49	2x sliders open	-1.03
17.5%	12/14/2024 4:...	1220mL Trans ...	13855712		Airflow Volume	kcfm	23.1	28		4.9
92.9%	12/14/2024 4:...	1220mL Crush...	13856776		Airflow Volume	kcfm	3.09	43.6	Fan off, air goi...	40.51
14.7%	12/14/2024 4:...	1195-1220 Mai...	13854055		Airflow Volume	kcfm	260.12	226.7		-33.42
99.2%	12/14/2024 4:...	1220mL Crush...	13855054		Airflow Volume	kcfm	0.33	41.3		40.97
4.6%	12/14/2024 4:...	1195-1220 Mai...	13853739		Airflow Volume	kcfm	261.97	274.5		12.53
29.1%	12/14/2024 4:...	1080 Vent Doo...	14234200		Differential Pre...	in w.g	0.84	1.19		0.35

Model Calibration using VentLOG

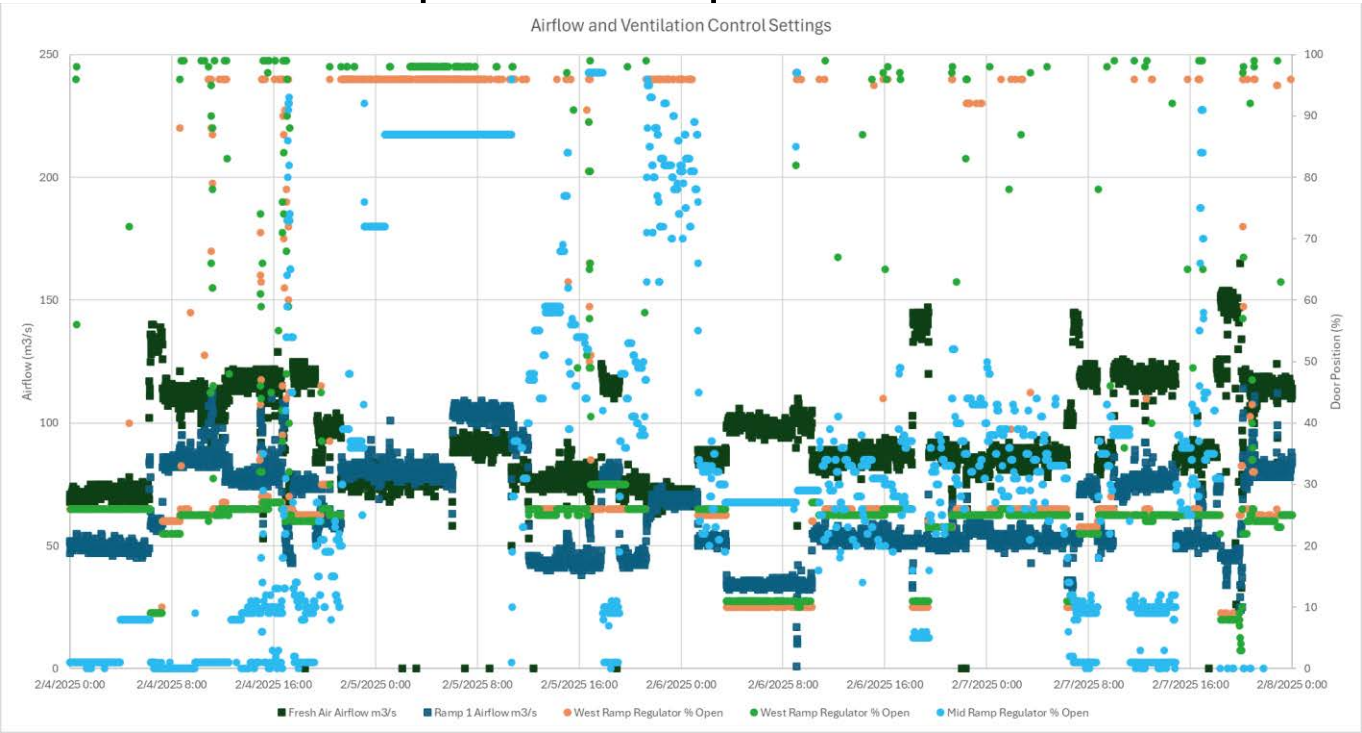
Model Calibration: Considerations

- An airflow model depends on airflow and pressure data
- A thermal model depends on temperature and heat (psychrometric) data

- Compare both **airflow** and **pressure** data
- Record fan operating points and settings (blade angle, speed)
- Some data will NOT balance well (due to bad measurements, unusual conditions, etc.)
  - Discard (or *archive*) known bad measurements
  - Decide how to handle balanced data
- Have vent automation records? Measurement timestamps can help!

Reviewing Data with Timestamps

- Similar limitations as any vent survey: documenting
  - Timestamp can be helpful to know state of vent controls



Record of VOD system changes of regulator settings, airflows

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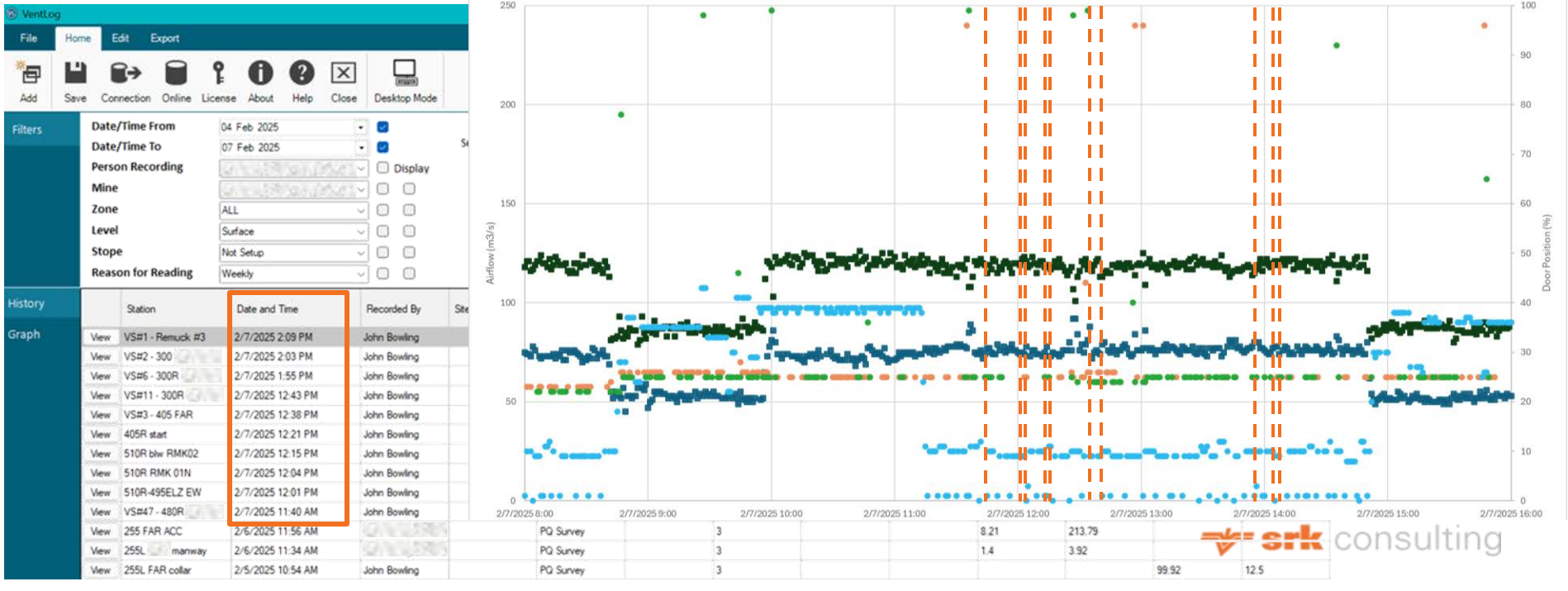
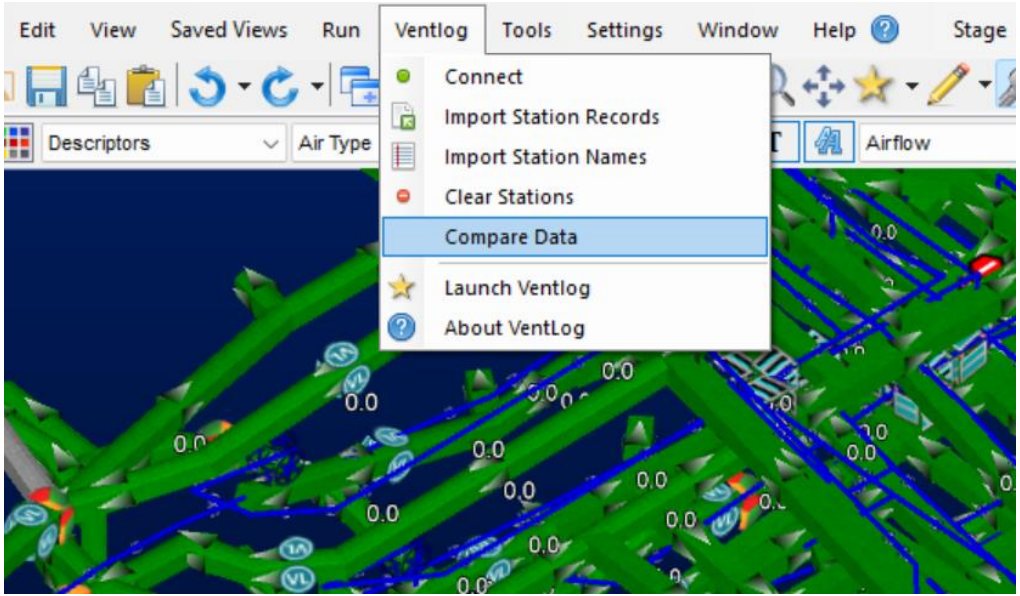
Reviewing Data with Timestamps

- Similar limitations as any vent survey: documenting
  - Timestamp can be helpful to know state of vent controls



Model Calibration: Compare data

- VentLOG > Compare Data



Model Calibration: Compare data

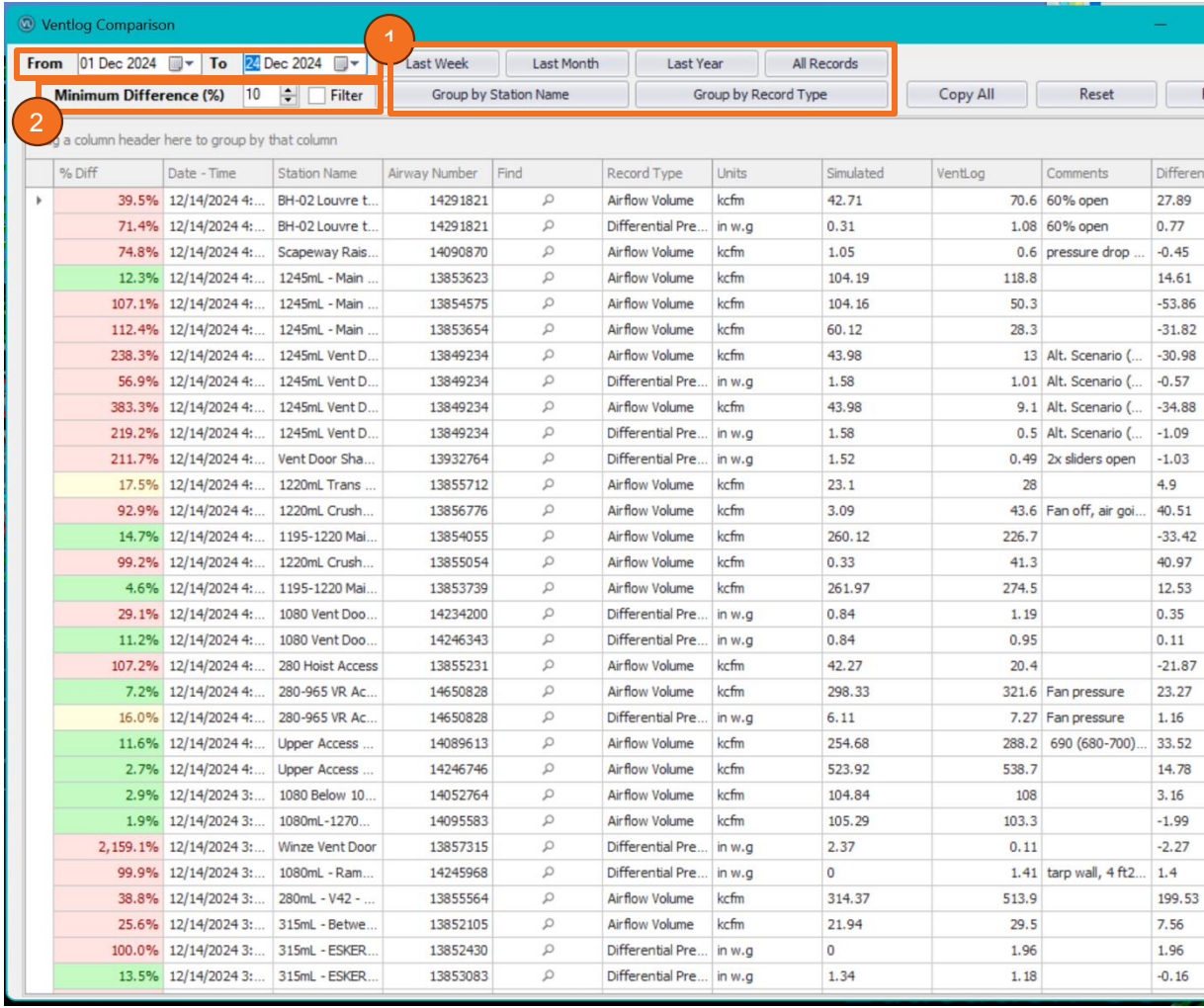
1. Filter by date and record type (e.g. Airflow Volume, Differential Pressure, etc.)
2. Filter by % difference if desired to target the biggest deviations

Notes:

raw data ≠ balanced data

Consider data reliability

Apply Kirchoff's laws?



% Diff	Date - Time	Station Name	Airway Number	Find	Record Type	Units	Simulated	VentLog	Comments	Differen
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238.3%	12/14/2024 4:...	1245mL Vent D...	13849234		Airflow Volume	kcfm	43.98	13	Alt. Scenario (...	-30.98
56.9%	12/14/2024 4:...	1245mL Vent D...	13849234		Differential Pre...	in w.g	1.58	1.01	Alt. Scenario (...	-0.57
383.3%	12/14/2024 4:...	1245mL Vent D...	13849234		Airflow Volume	kcfm	43.98	9.1	Alt. Scenario (...	-34.88
219.2%	12/14/2024 4:...	1245mL Vent D...	13849234		Differential Pre...	in w.g	1.58	0.5	Alt. Scenario (...	-1.09
211.7%	12/14/2024 4:...	Vent Door Sha...	13932764		Differential Pre...	in w.g	1.52	0.49	2x sliders open	-1.03
17.5%	12/14/2024 4:...	1220mL Trans ...	13855712		Airflow Volume	kcfm	23.1	28		4.9
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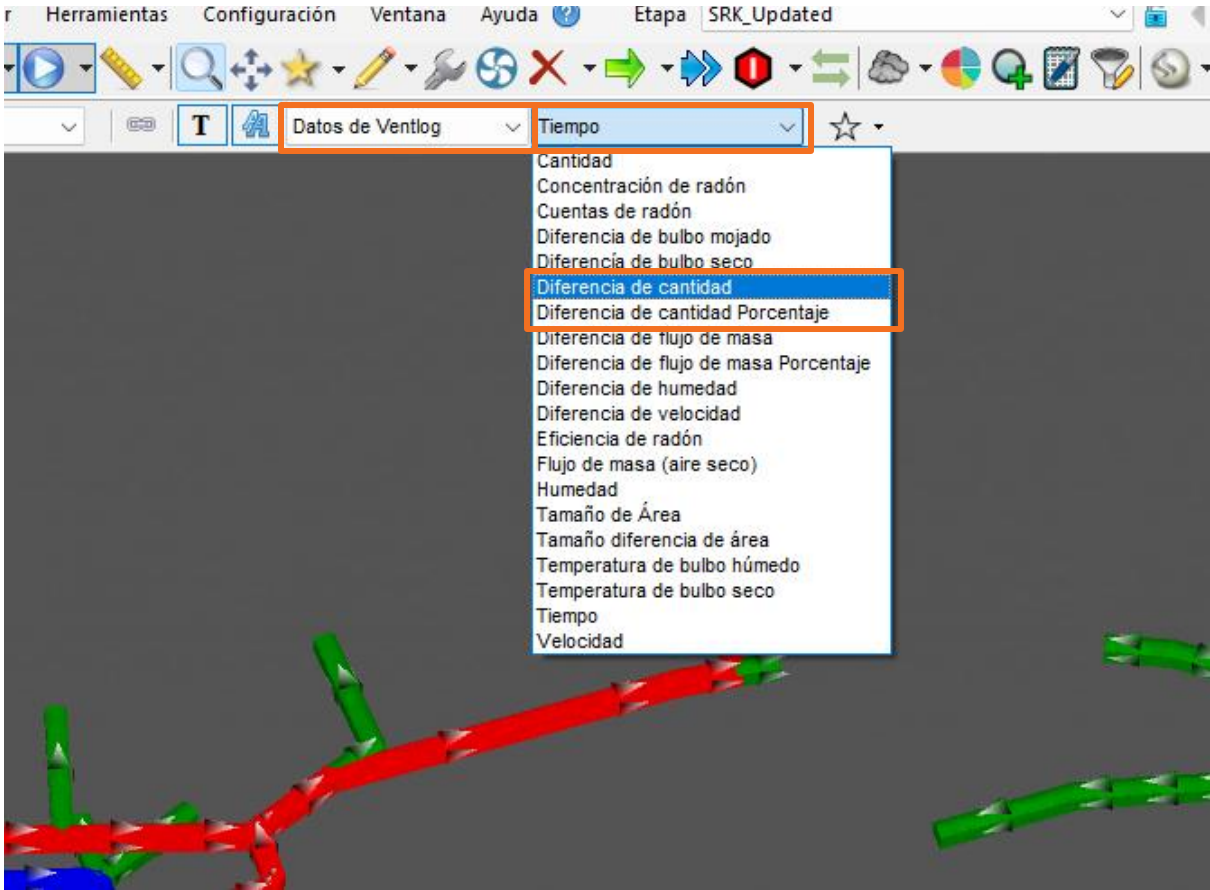
14.7%	12/14/2024 4:...	1195-1220 Mai...	13854055		Airflow Volume	kcfm	260.12	226.7		-33.42
99.2%	12/14/2024 4:...	1220mL Crush...	13855054		Airflow Volume	kcfm	0.33	41.3		40.97
4.6%	12/14/2024 4:...	1195-1220 Mai...	13853739		Airflow Volume	kcfm	261.97	274.5		12.53
29.1%	12/14/2024 4:...	1080 Vent Doo...	14234200		Differential Pre...	in w.g	0.84	1.19		0.35
11.2%	12/14/2024 4:...	1080 Vent Doo...	14246343		Differential Pre...	in w.g	0.84	0.95		0.11
107.2%	12/14/2024 4:...	280 Hoist Access	13855231		Airflow Volume	kcfm	42.27	20.4		-21.87
7.2%	12/14/2024 4:...	280-965 VR Ac...	14650828		Airflow Volume	kcfm	298.33	321.6	Fan pressure	23.27
16.0%	12/14/2024 4:...	280-965 VR Ac...	14650828		Differential Pre...	in w.g	6.11	7.27	Fan pressure	1.16
11.6%	12/14/2024 4:...	Upper Access ...	14089613		Airflow Volume	kcfm	254.68	288.2	690 (680-700)...	33.52
2.7%	12/14/2024 4:...	Upper Access ...	14246746		Airflow Volume	kcfm	523.92	538.7		14.78
2.9%	12/14/2024 3:...	1080 Below 10...	14052764		Airflow Volume	kcfm	104.84	108		3.16
1.9%	12/14/2024 3:...	1080mL-1270...	14095583		Airflow Volume	kcfm	105.29	103.3		-1.99
2,159.1%	12/14/2024 3:...	Winze Vent Door	13857315		Differential Pre...	in w.g	2.37	0.11		-2.27
99.9%	12/14/2024 3:...	1080mL - Ram...	14245968		Differential Pre...	in w.g	0	1.41	tarp wall, 4 ft2...	1.4
38.8%	12/14/2024 3:...	280mL - V42 - ...	13855564		Airflow Volume	kcfm	314.37	513.9		199.53
25.6%	12/14/2024 3:...	315mL - Betwe...	13852105		Airflow Volume	kcfm	21.94	29.5		7.56
100.0%	12/14/2024 3:...	315mL - ESKER...	13852430		Differential Pre...	in w.g	0	1.96		1.96
13.5%	12/14/2024 3:...	315mL - ESKER...	13853083		Differential Pre...	in w.g	1.34	1.18		-0.16

Model Calibration: Compare data

VentLOG data is another parameter in Ventsim – visible by color and value in the visual interface

Simplified local model calibration – indentify where the model and measurements differ



Case Studies - Implementation

1. On-site technician with off-site long-range planning (corporate)
2. All vent expertise on-site
3. Consulting (remote support)

- Allowed for sharing from the same VLG file (less confusion)
- Multiple people from multiple sites synced
- Definitive calibration – easier for all parties to quantify and understand
- Standardized record-keeping

Conclusions: VentLOG Pros and Cons

Pros

- 3D visual communication: **data in context in Ventsim**
- Simplified records – one source
- Remote data sharing/sync
- Simplified export to maps
- Simplified, transparent model calibration

Cons (current limitations)

- Importer tool is standalone, can be challenging
- Must commit to one unit set in database
- Some units unclear in VentLOG, lacks good user documentation

Conclusions:
PQ Surveys with VentLOG

Strengths

- Produce schematic from Ventsim + VentLOG data
- Filter VentLOG data by date/time range
- Traceable data (recorder, timestamps)
- Tablet interface is quick and enforces quality *if setup correctly*

Issues to sort out:

- Balanced data from measured data? *some QA from data entry*
- Which data are reliable?
- How to display pressure measurements over (>1 airway)?
- Psychrometric survey?
- Fan/duct pitot tube survey tool?

Tips for Using VentLOG

- Minimize new VentLOG stations
  - Understand which stations/airways are really the same!
  - Move development face stations (update area)
- Add stations in Ventsim (from the office)
- Decide on a name scheme and be consistent!
- Define Groups, Levels, Activities, etc. well (at the beginning)
- Buy a tablet (ok… a few) with its own VentLOG license
- Decide on a sync location/scheme

VentLOG Workflows – Lessons Learned

Ventilation on-site

- For routine vent (flow) surveys VentLOG saves a LOT of time
- The more frequent the survey, the more time saved
- Best with a tablet

As a consultant

- For first time/one-off PQ survey … mixed results
- Initial setup takes longest by far. *Hire out to a consultant?*
- Did not rule out paper maps, field books – not all data feeds neatly into VentLOG

Consultant's Point of View

- All the work is in the VentLOG initial setup
- Easy for client (end user) to maintain the database
- Calibrated model is a valuable deliverable
- With VentLOG, the calibrated model is:
  - transparent, defensible, repeatable
- Empowers client (end user) to maintain model calibration
- Simplifies future calibration and troubleshooting (I hope, TBD!)

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Thank you for your attention

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What does VentLOG do?

Record and store ventilation records.

- Database format forces accountability

Communicate data between users/models

- Remote tech services and consultants view site data **in context**
- Eliminate questions, e.g. location, time/date of measurements

Simplify model validation (calibration)

Export survey data to maps

- DXF w/ aligned arrows or as database

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