Quality Review and Exchange System for Tribes (QREST) Introduction

January 26, 2021

Webinar Logistics

- Webinar is being recorded – URL for the recording will be in post-webinar email and posted at https://bit.ly/AIAQTPwebinars
- Please complete the webinar feedback survey – Link for the feedback survey will be in post-webinar email
- Certificates will be emailed to participants
- Reviewing Air Quality Permits **https://forms.gle/w3ccizCHo68ugjHs7**

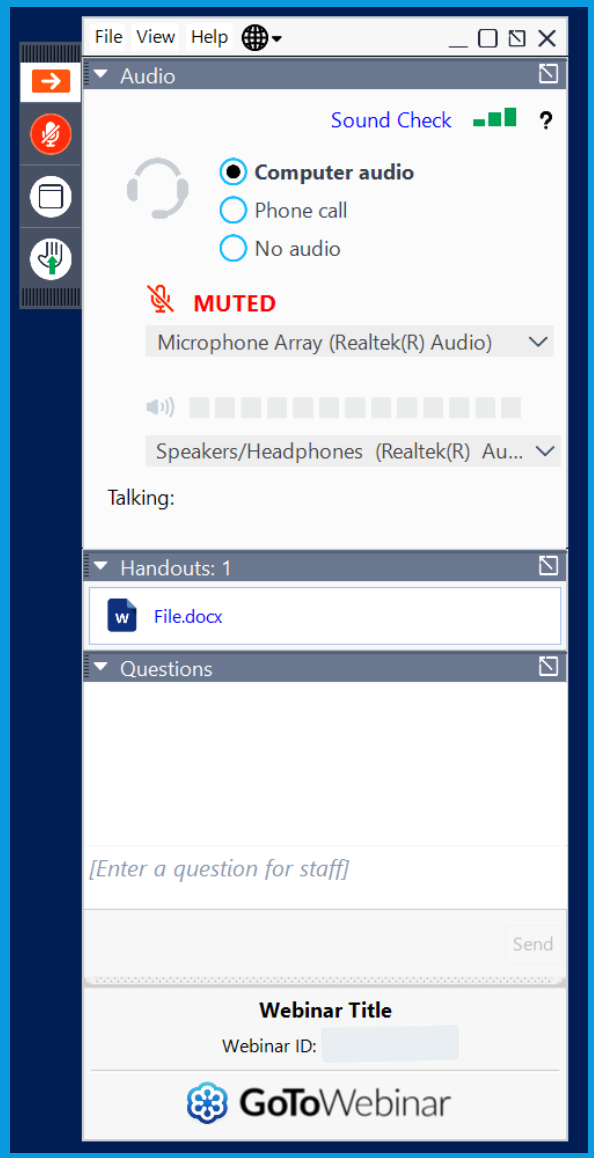
Thank you for joining! We will begin the webinar shortly.

Tuesday, December 7, 2021; 10:00am-11:30am Pacific Time

Submit questions in the "Questions" pane

Raise your hand if you would like to be unmuted

Download files from the "Handouts" pane



Presented by the Institute for Tribal Environmental Professionals
American Indian Air Quality Training Program
Questions? Contact Christal.Black@nau.edu

Today's objectives:

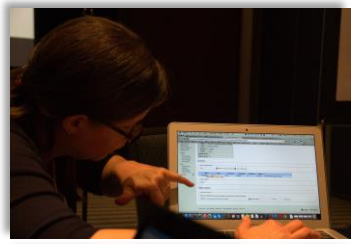
- Introduce QREST
  - Built for Tribal Agencies
  - Open source (no license fees, all code public)
  - TAMS Center managed
  - Tribal Agencies are their Agency Admins
  - Flexible: can manually import or automatically poll data, can use QC features or AQS node only
  - Help files, SOPs, videos, and individual assistance
- Learn more about your needs

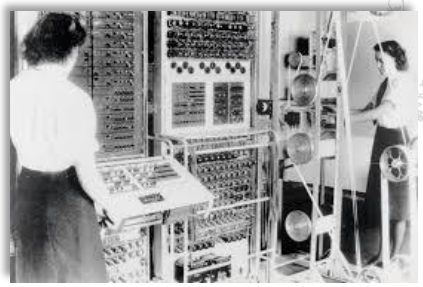
Poll Question 1

- Does your program now gather air data? y/n
- If yes, what do you use to manage the data?
  - We use MS Excel to review data and calculate summary statistics, make charts
  - Proprietary software (e.g. AirVision)
  - Tribal Data Toolbox (from the TAMS Center)
  - No current data management system, just collect the data
  - Use a contractor to manage our data

What is Open Source?

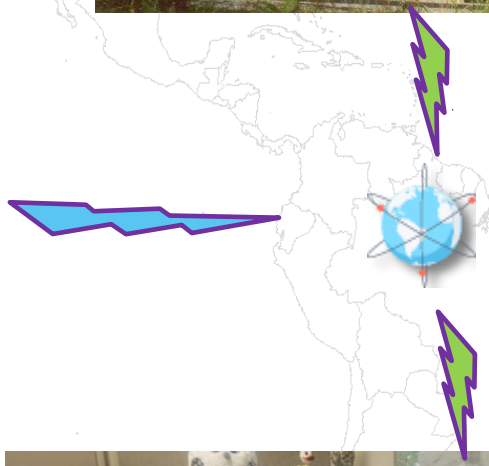
- A world community of users who, following the open source model, provide packages and code and advice in numerous forums, **completely free.**
- "**Open source**" means more than just code that is available free to anyone; it includes a philosophy (***the open source way***) for any kind of project that embraces and celebrates principles of open exchange, collaborative participation, rapid prototyping, transparency, meritocracy, and community-oriented development.

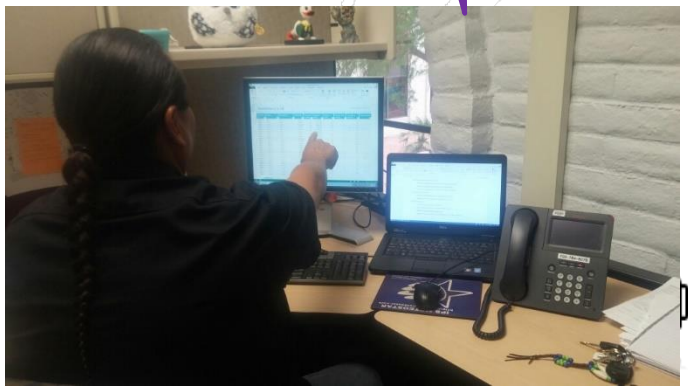




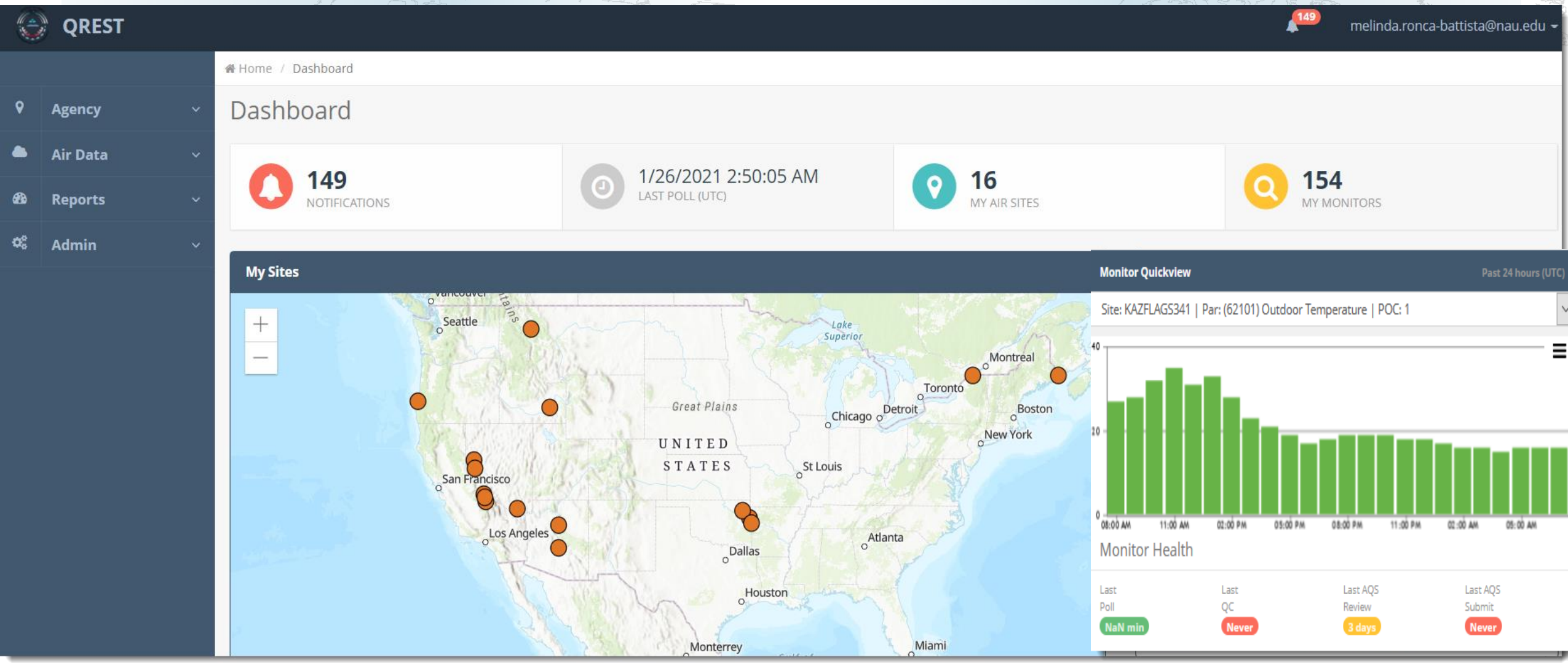
What is cloud software?

- Accessible from any internet browser
- Run on remote servers (aka computer processing and storage use rented from Microsoft or Amazon, or others)
- With open source software, this cloud system:
  - Has no software licensing fees,
  - can be modified and updated by any qualified contractor,
  - management costs can be minimal (e.g., ITEP manage; updating)
  - has low cloud storage costs – backed up every night—30 days of full backup
  - TAMS Center can push out changes to everyone as instruments/EPA guidance/laws change
  - *New features will be based on YOUR needs—this is your tool.

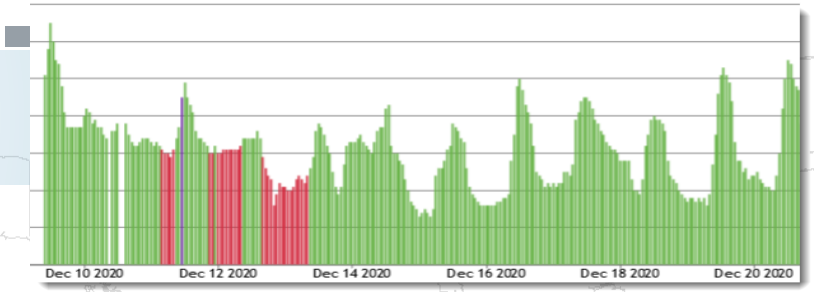




Dashboard Provides Access and Control

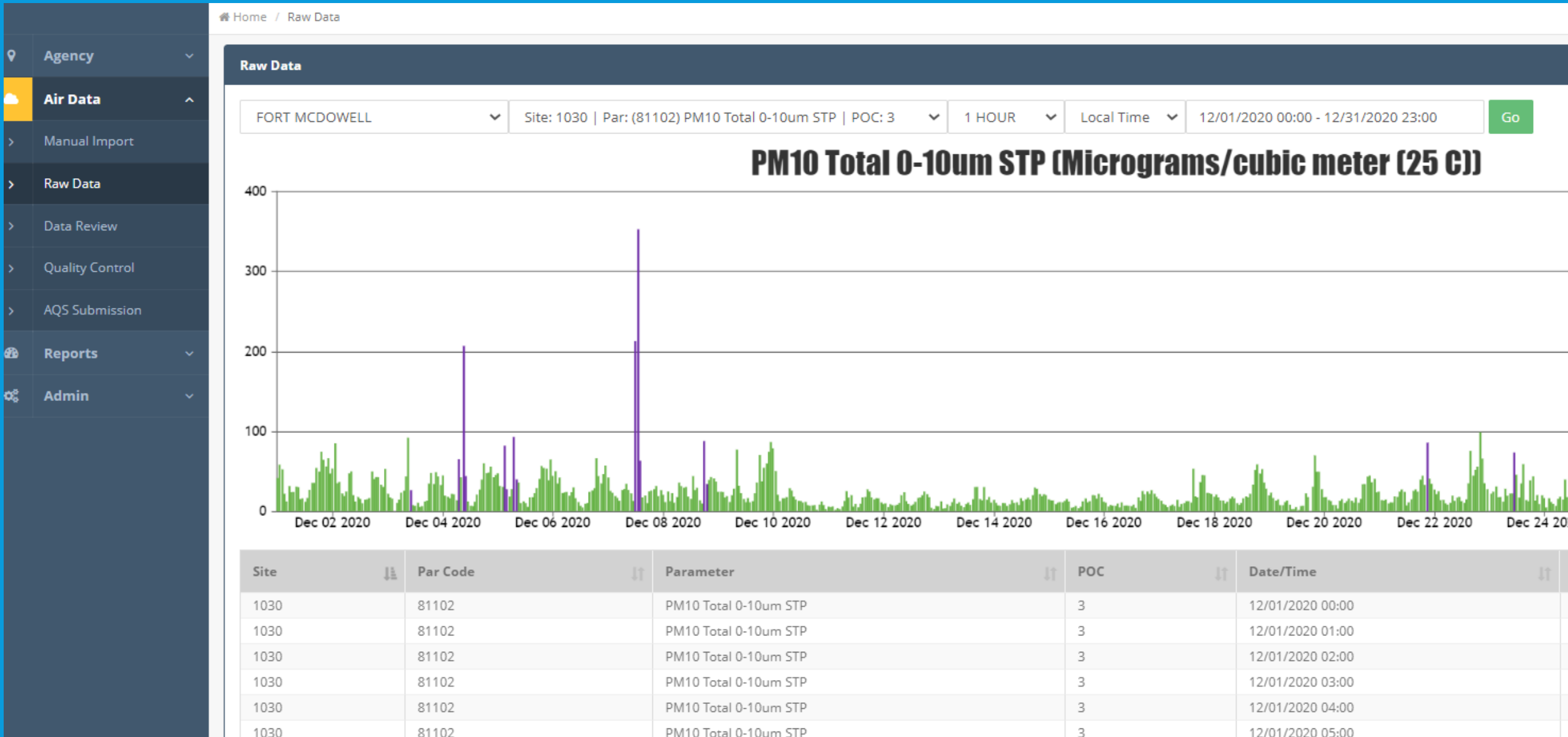


QREST Features:

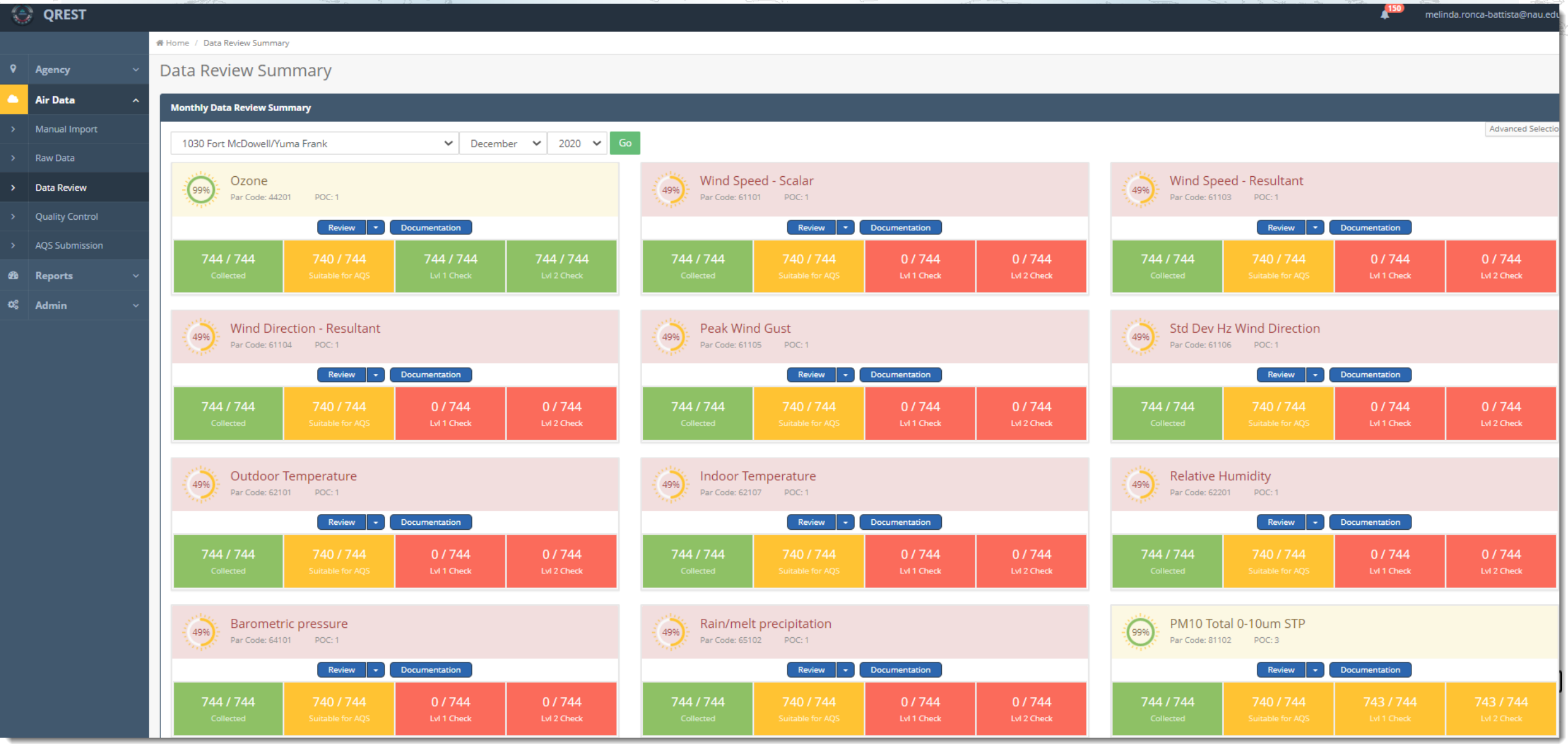


- Each Tribal Agency manages their own site, monitors, alerts, and data and who has access,
- Audit trail of any changes—your Agency Admin sees all
- Charts and summary statistics exportable for reports,
- Provides a platform for fulfilling the independent quality assurance function (two levels of separation required between data gatherer and final data validation) required for regulatory and legally-defensible data,
- Reference and supporting data stored and accessible by data validators,
- Provide a public website with maps and (tribal-agency-approved) data,
- push data directly from QREST webpage to the Exchange Network (AQS and the EPA's AirNow)

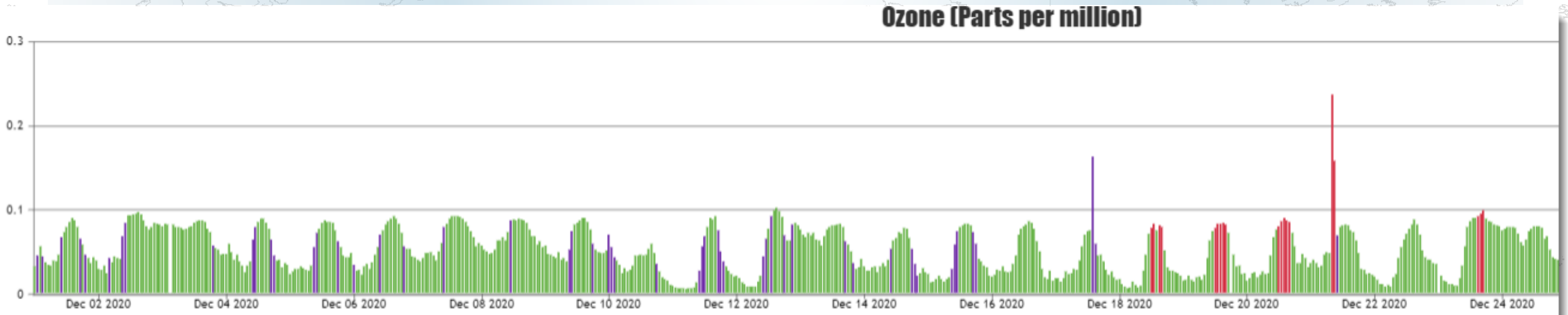
To know your data is to love your data:



Your Data Available Anytime, Anywhere (with internet access)



3 Levels of Data Review



Back

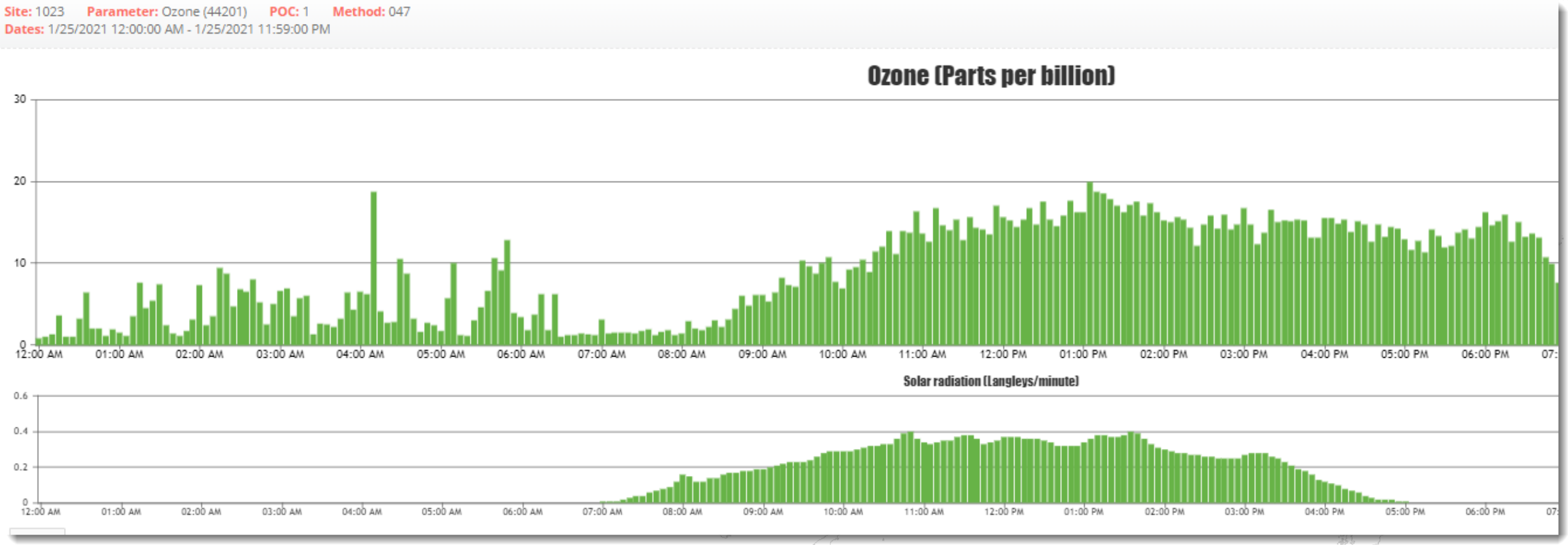
All	Site	Par Code	Parameter	POC	Local Std Time	Value	Unit	QREST Flags	AQS Null Code	AQS Qual Codes	Suitable for AQS	Lvl 1	Lvl 2
☐	1030	44201	Ozone	1	12/01/2020 00:00	0.032	Parts per million			1V	Y	Karen Shaw 12/29/2020	Karen Shaw 12/29/2020
☐	1030	44201	Ozone	1	12/01/2020 01:00	0.045	Parts per million	JUMP		1V	Y	Karen Shaw 12/29/2020	Karen Shaw 12/29/2020
☐	1030	44201	Ozone	1	12/01/2020 02:00	0.056	Parts per million			1V	Y	Karen Shaw 12/29/2020	Karen Shaw 12/29/2020

Poll Question 2

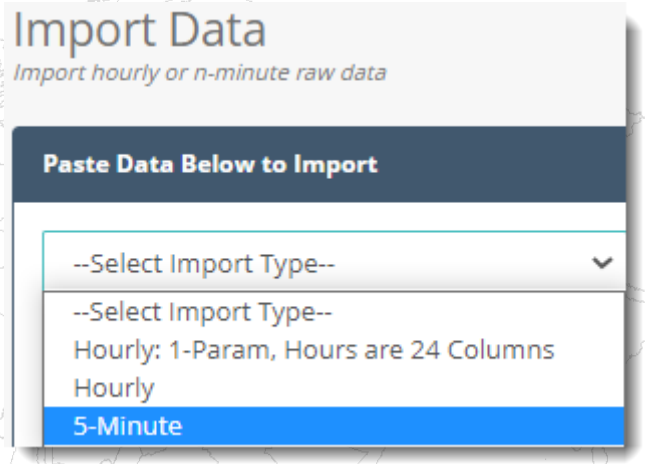
How do you access your data?

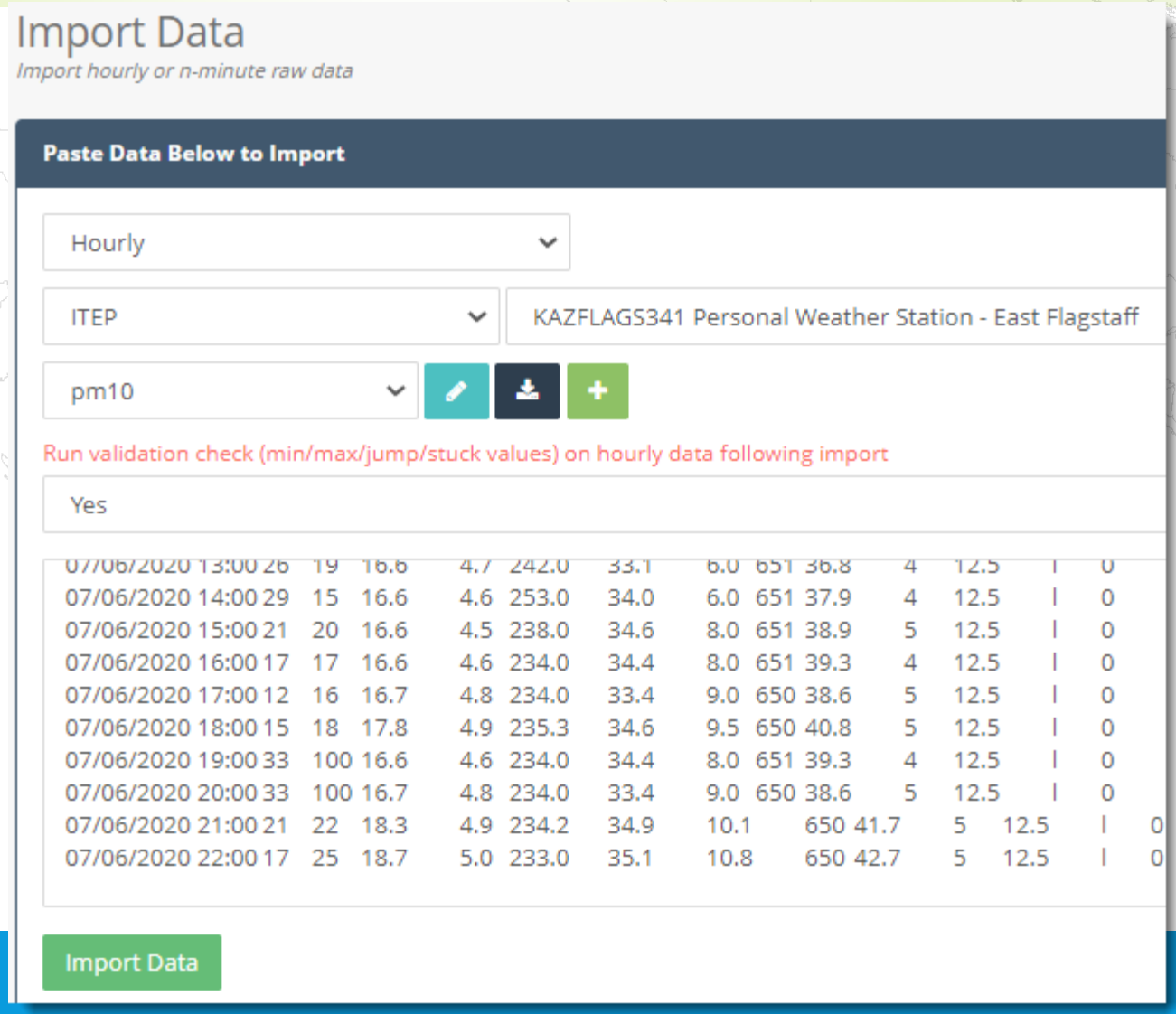
1. Remote access via site telemetry
2. Site visit and manual download from analyzer

5-minute data pollable and importable:

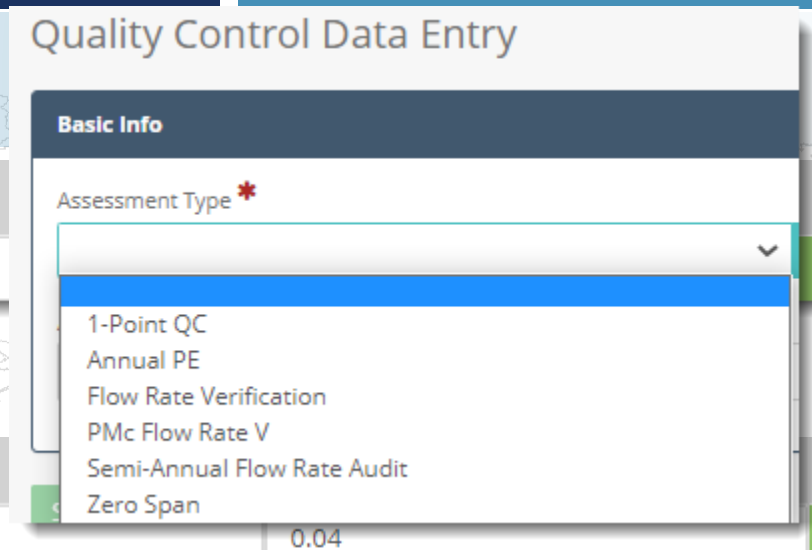


One year of data can be imported at a time, and easy as staying in your yoga pants all day:





- QC Data Management:



Assessment (known or true) Value		% Difference	Concentration Range
0.065		1.54	In valid concentration range (0.005-0.08)

Assessment (known or true) Value		Difference	% Difference	Concentration Range
0.04	0.04	0.00	0.00	Concentration range: 0.04 to 0.069
0.06	0.061	0.001	1.67	Concentration range: 0.04 to 0.069
0.07	0.071	0.001	1.43	Concentration range: 0.07 to 0.089
0.03	0.031	0.001	3.33	Concentration range: 0.02 to 0.039
0.025	0.023	0.002	8.00	Concentration range: 0.02 to 0.039
				Covers 3 distinct Audit Levels

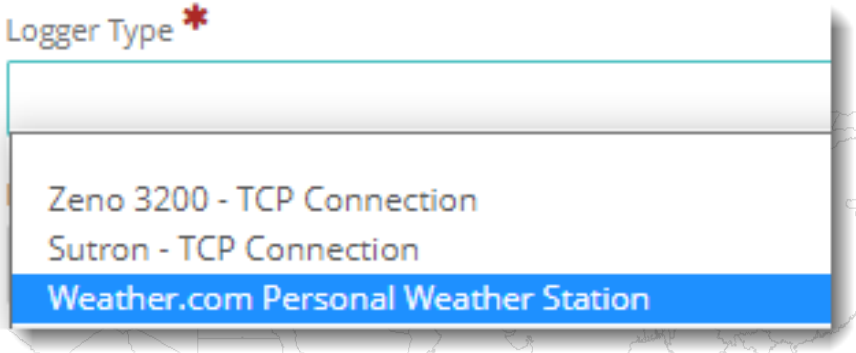
Send to AQS

Poll Question 3

Do you use a datalogger? y/n
If yes, what kind of datalogger?

1. Sutron
2. Campbell Scientific
3. Zeno
4. ESC/Agilaire
5. other

Now polling Sutron and Zeno dataloggers, and 1 weather station



Column Mapping

	Col	Sum	Prec	Par / Method
Edit	10	AAVG	0	61104 - Wind Direction - Resultant Method: 020 POC: 1
Edit	10	ADEV	0	61106 - Std Dev Hz Wind Direction Method: 020 POC: 1
Edit	16	AVG	1	61101 - Wind Speed - Scalar Method: 050 POC: 1
Edit	19	MAX	1	61105 - Peak Wind Gust Method: 020 POC: 1
Edit	22	AVG	1	62101 - Outdoor Temperature Method: 040 POC: 1
Edit	25	AVG	1	62103 - Dew Point Method: 020 POC: 1

Monitor Ping Results

Ping Results

Ping Only Retrieve Data

Last X Records: 5

Submit

Last X records

```
1026,21/01/26,04:35:00,0,1,K,7.40,2,K,319.20,3,K,11.00,4,K,7.50,5,K,11.70,6,K,24.90,7,K,20.60,8,K,0.00,9,K,862.10,10,K,0.0000,24,K,34.20,35,K,4.40,38,K,88,50,K,0.0000,51,K,99000,
1026,21/01/26,04:40:00,0,1,K,7.40,2,K,329.90,3,K,10.20,4,K,7.50,5,K,10.00,6,K,25.00,7,K,20.20,8,K,0.00,9,K,862.11,10,K,0.0000,24,K,34.10,35,K,4.40,38,K,87,50,K,0.0000,51,K,99000,
1026,21/01/26,04:45:00,0,1,K,6.10,2,K,322.70,3,K,10.60,4,K,6.20,5,K,8.50,6,K,25.00,7,K,20.00,8,K,0.00,9,K,862.16,10,K,0.0000,24,K,34.00,35,K,4.39,38,K,86,50,K,0.0000,51,K,99000,
1026,21/01/26,04:50:00,0,1,K,4.60,2,K,313.00,3,K,10.70,4,K,4.70,5,K,6.80,6,K,24.90,7,K,19.40,8,K,0.00,9,K,862.19,10,K,0.0000,24,K,34.00,35,K,4.40,38,K,85,50,K,0.0000,51,K,99000,
1026,21/01/26,04:55:00,0,1,K,4.70,2,K,307.10,3,K,10.40,4,K,4.70,5,K,6.60,6,K,24.90,7,K,19.10,8,K,0.00,9,K,862.26,10,K,0.0000,24,K,33.90,35,K,6.01,38,K,84,50,K,0.0000,51,K,99000,68
```

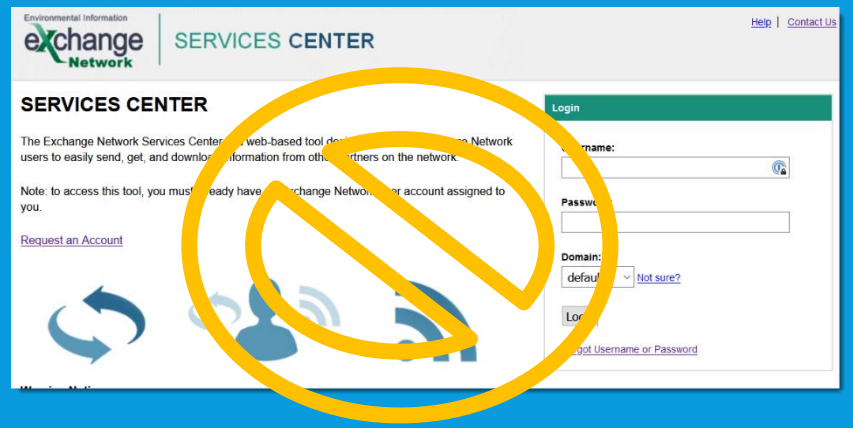
Poll Question 4:

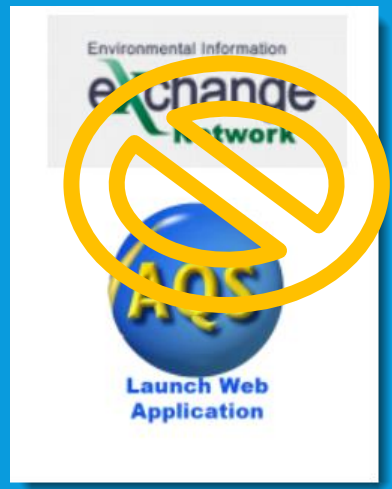
- How do you format your data for upload to EPA's AQS?
  1. MS Excel template
  2. EPA's Transaction Generator
  3. Contractor
  4. my datalogger outputs in AQS format and I manually send data through the Exchange Network Services Center and from there into AQ
  5. I do not send data to AQS

nge	Submitted By	Comments	Download	Status
0:00 AM - 1/1/0001	melinda ronca-battista		AQS_QA_20111206.txt Header File	Processing Get Status
00:00 AM - 00:00 AM	Melinda Ronca-Battista		AQS_20201201_20201201.txt Header File	File Created Submit to EPA
0:00 AM - 2/1/2020	Melinda Ronca-Battista	looks like there is on record still as ppb so must fix that in the data then regenerate the file	AQS_20200201_20200201.txt Header File	Completed
0:00 PM - 4/1/2020	Melinda Ronca-Battista		AQS_20200401_20200401.txt Header File	Completed

```
QA|I|Flow Rate Verification||04|005|9001|81102|1|20111206|0079|073|16.7|16.67
```

```
RD|I|04|005|9001|44201|1|1|007|047|20200201|00:00|0.028
RD|I|04|005|9001|44201|1|1|008|047|20200201|01:00|0.027
RD|I|04|005|9001|44201|1|1|007|047|20200201|02:00|0.021
```





Prepare AQS Submission

Select Data to Submit

Site: KAZFLAGS341 Personal Weather Station - East Flagstaff

Parameters:
- (Toggle All)
- Par: (43776) Radon | Method: 001 | POC: 1
- Par: (61101) Wind Speed - Scalar | Method: 020 | POC: 1
- Par: (61104) Wind Direction - Resultant | Method: 130 | POC: 1
- Par: (62101) Outdoor Temperature | Method: 044 | POC: 1
- Par: (62201) Relative Humidity | Method: 059 | POC: 1
- Par: (63301) Solar radiation | Method: 014 | POC: 1
- Par: (64101) Barometric pressure | Method: 014 | POC: 1
- Par: (65102) Rain/melt precipitation | Method: 060 | POC: 1
- Par: (81102) PM10 Total 0-10um STP | Method: 079 | POC: 1
- Par: (Q00003) AAnewParameter | Method: 001 | POC: 1
- Par: (Q00007) TestInstrumentFlag2 | Method: 001 | POC: 1

Date Range: 12/01/2020 00:00 - 12/31/2020 23:00

Action Code: Insert

Data Format: Flat File

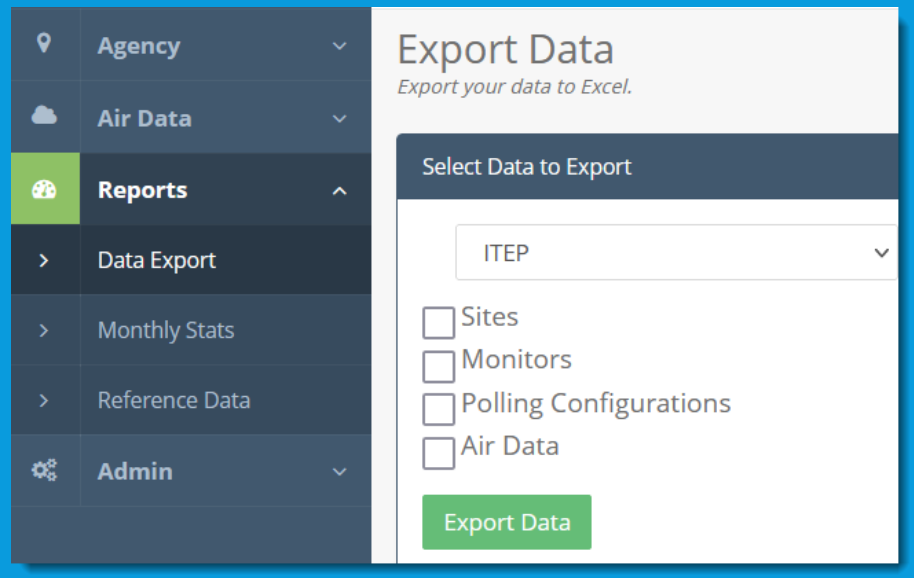
Back | Review Data

Poll Question 5

What is your biggest frustration about air data management?

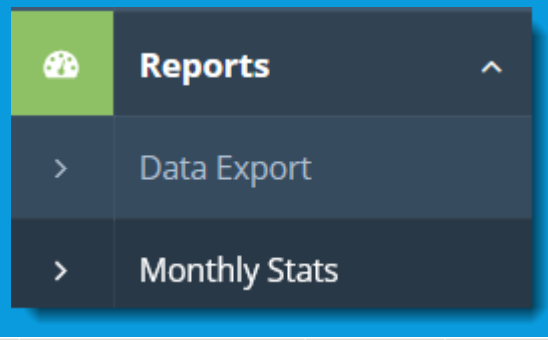
- 1. Time consuming
- 2. No qualified people are available to conduct an independent data review
- 3. Getting data into AQS
- 4. Managing monitoring equipment (maintenance, repair, calibrations)
- No frustrations—data management and reporting is super fun ☺
-

Reports:

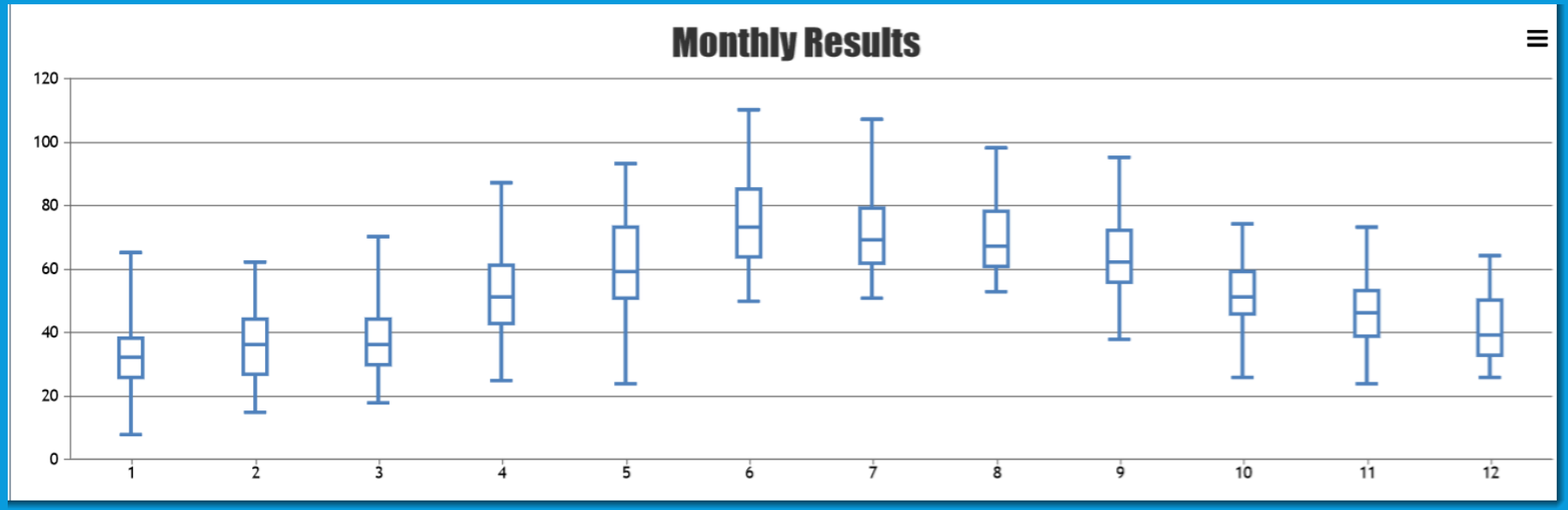


B	C	D	E	F	G	H	I	J
Site ID	Par Code	Par Name	Method Code	POC	Duration Code	Collect Freq Code	Collection Unit Code	Alert Min
APITEST	62101	Outdoor Temperature	040	1	1		015	-60
APITEST	88502	Acceptable PM2.5 AQI & Speciation Mass	771	1	1		105	-0.4
KAZFLAGS341	62101	Outdoor Temperature	044	1	1		015	38
KAZFLAGS341	65102	Rain/melt precipitation	060	1	1		021	0
KAZFLAGS341	61101	Wind Speed - Scalar	020	1	1		012	0
KAZFLAGS341	43776	Radon	001	1	1		130	0
KAZFLAGS341	61104	Wind Direction - Resultant	130	1	1		014	0
KAZFLAGS341	Q00003	AAnewParameter	001	1	D	R	132	1
KAZFLAGS341	64101	Barometric pressure	014	1	1		016	0
KAZFLAGS341	81102	PM10 Total 0-10um STP	079	1	1		001	-25
KAZFLAGS341	62201	Relative Humidity	059	1	1	1	019	-30
KAZFLAGS341	Q00007	TestInstrumentFlag2	001	1	1	9	050	0
KAZFLAGS341	63301	Solar radiation	014	1	1		025	0

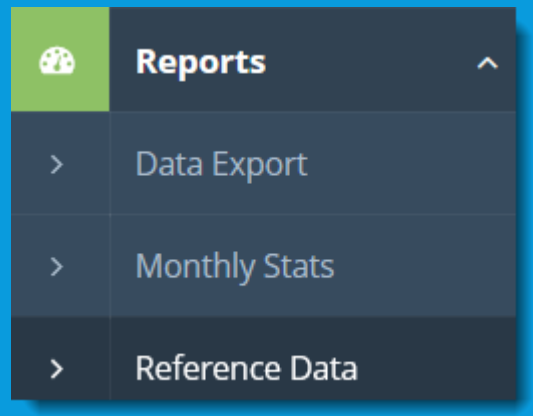
Monthly Statistics Report:



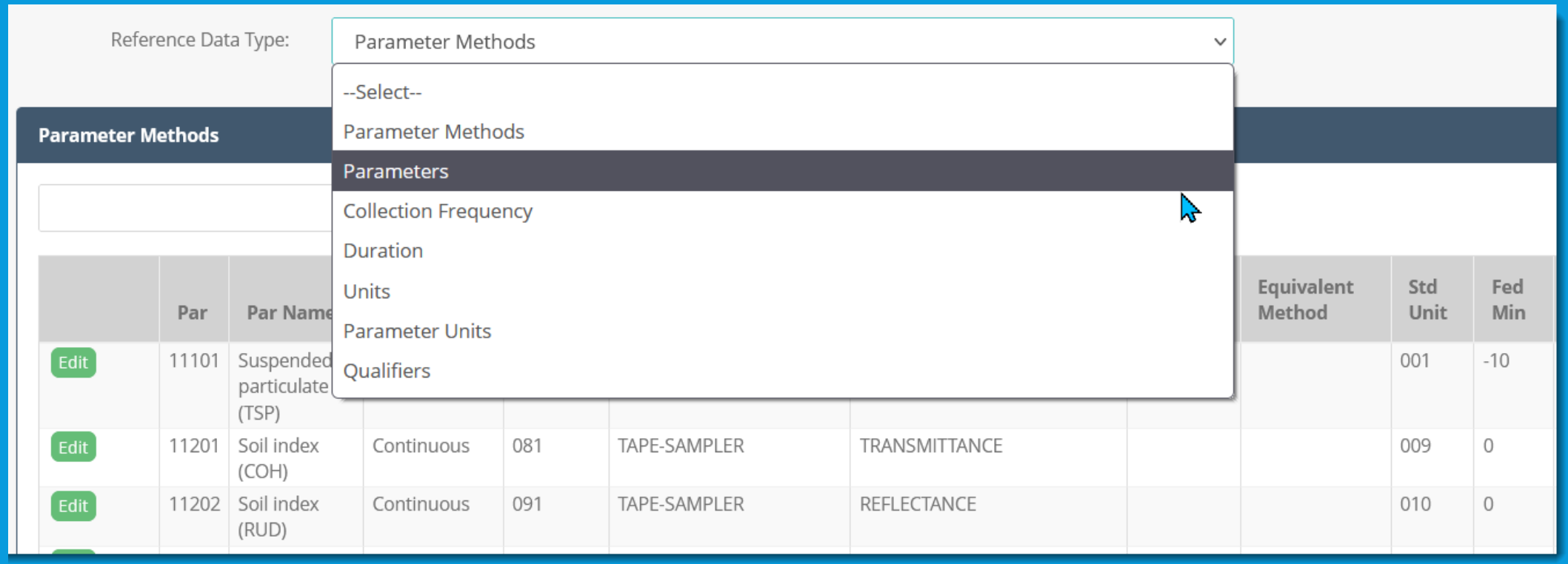
Year	Month	Min	Mean	% annual hours below monthly mean	Median	Max	DateTime of Max	2nd Max	Max - 2nd Max Difference	Std Dev	25th Ntile	75th Ntile	Completeness
2021	1	8	32	13	32	65	1/17/2021 12:00:00 PM	65	0	10	26	38	658 / 744
2021	2	15	36	19	36	62	2/19/2021 12:00:00 PM	62	0	11	27	44	466 / 672
2021	3	18	38	22	36	70	3/29/2021 12:00:00 PM	67	3	11	30	44	451 / 744



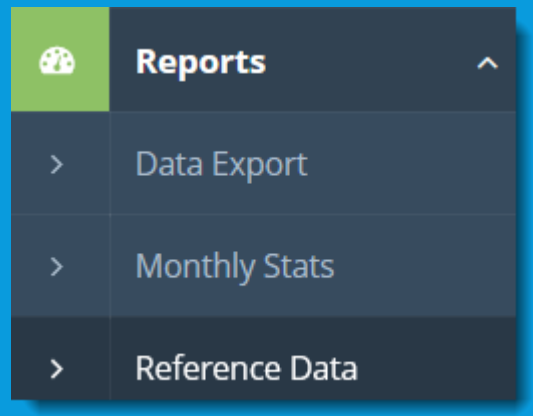
Reference Data:



See all AQS methods, units, etc., and custom parameters can be added (e.g., filter loading, soil temp.)

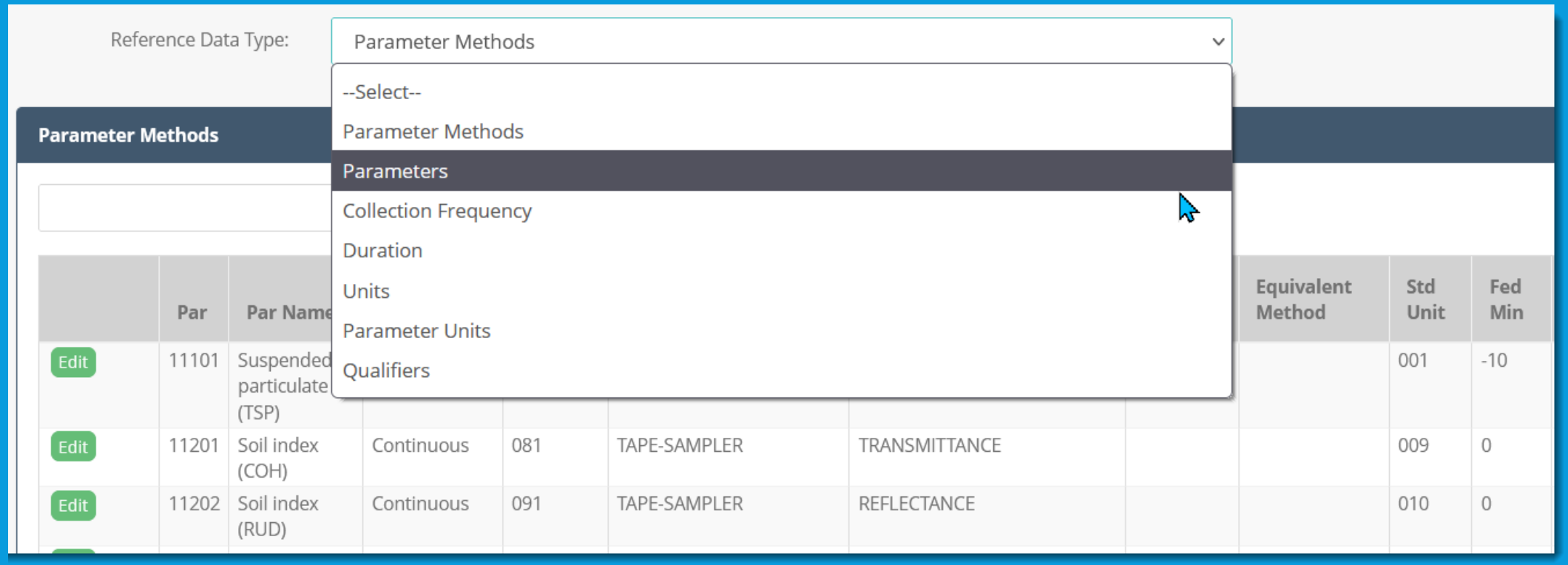


Tribal Agency Admin:

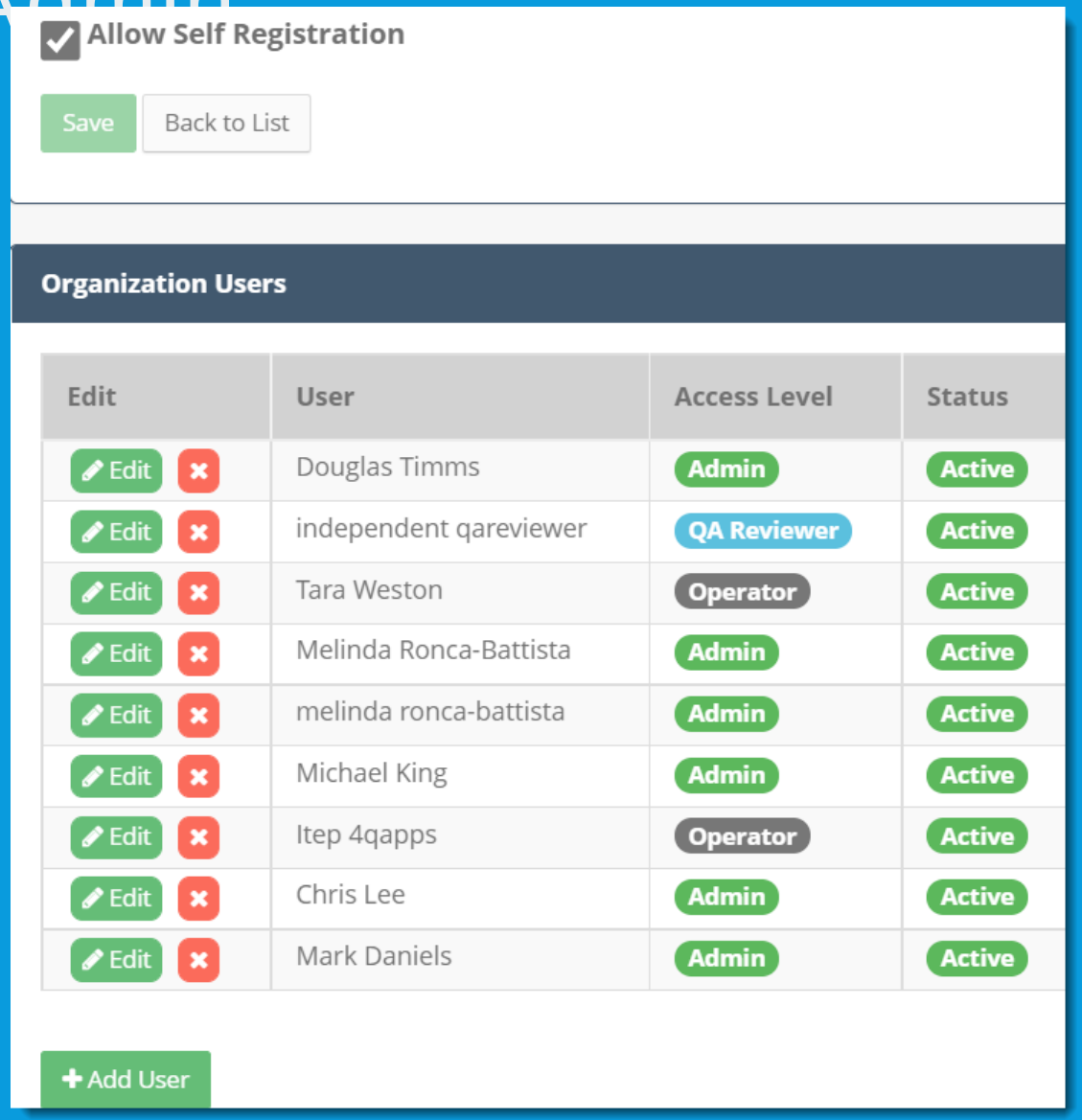


See all AQS methods, units, etc., and custom parameters can be added (e.g., filter loading, soil temp.)

See all AQS methods, units, etc., and custom parameters can be added (e.g., filter loading, soil temp.)



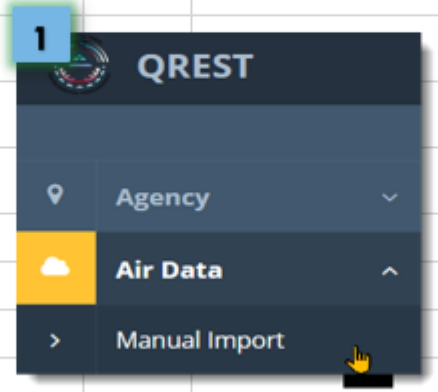
Tribal Agency Admin:

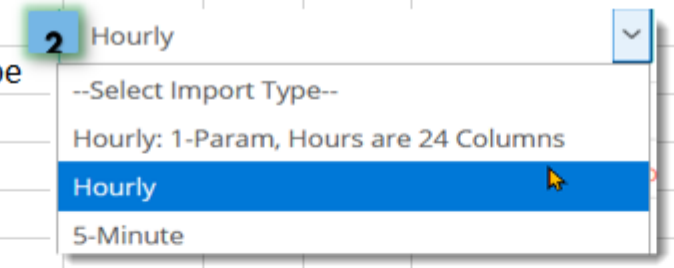


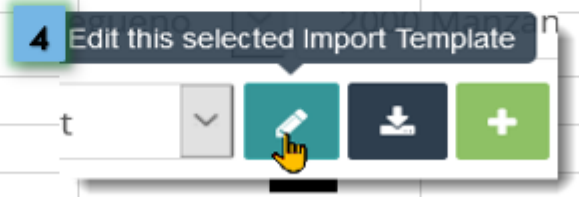
Agency Admin controls users and their access

Self Registration means that a new user can register and request to be associated with your Agency, but the Tribal Admin has to approve their affiliation and role before they can sign in.

SOP:	Manual Importing	version:	1.0	date:	01/12/2021	responsibility:	Site Operator
						required:	electronic data file to be imported (up to one year of hourly data for 1 parameter)
Step:							
1	Go to Air Data->Manual Import					prereq:	The appropriate Import Config has been established in QREST for this datafile's format
2	Select datafile type						
3	Select Agency, Site, and the Import Template that is appropriate for the datafile format.						
4	If the Import Template needs to be edited for this datafile's format, edit and save with a new name, as appropriate (see SOP for Setting Import Config).						







QREST Help

Getting Started

- Users Guide
- FAQ
- Tutorial Videos
- Creating an Account
- Retrieving Lost Password
- Dashboard

Site Management

- Tribe Management
- Site Management
- Monitor Management
- Polling Configuration

Air Data

- QREST Data Logger Retrieval Workflow
- Manual Import
- Raw Data
- Data Review
- Quality Control

For each row, enter in th
validation checks.

Validation Checks:

- Annual Perform
  - Distinct C
  - Percentag
    - Sulf
  - Concentra
    - Sulf
- 1-Point QC:
  - Concentra
    - Sulf
    - Ozo
  - Percentag
    - Sulf
    - Ozo
  - Concentra
    - Sulf
    - Ozo
- Flow Rate Verifi
  - Percentag
    - PM
    - PM

Training:

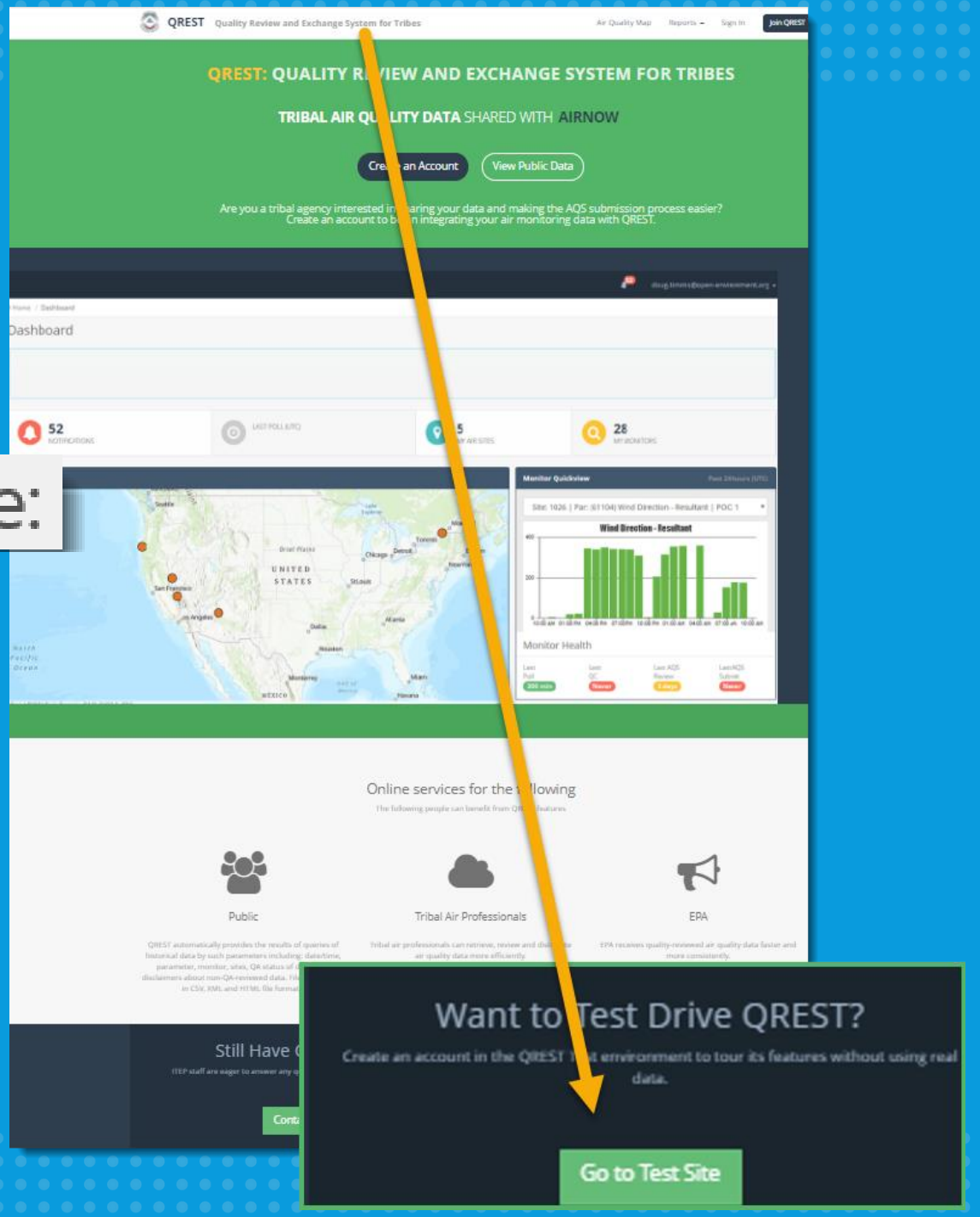
1	**Courses, Navigation, Internet Speed, Help, & SOPs** The user will learn about QREST resources, including the User's Manual, the online Help pages, and SOPs.	**Complete** 2 / 3 Lessons View Certificate
2	**QREST Onboarding Training** This course covers the steps necessary to get a tribal agency set up to begin using QREST. Data made public to AirNow by the owning tribal agency is available without an account, and without joining QREST. To use the QREST features, however, and manage your site(s), monitor(s), data, and transmissions to AQS, the operations described in this training are necessary. Note that if your site does not have internet access and you plan to use QREST with manually importing data, some steps of lesson 4 do not apply, but can be reviewed because it describes data formats and sequence in raw data files.	**Continue** 1 / 5 Lessons
3	**Site Operator Training** This course covers the on-going monthly tasks performed by a site operator including QC check data entry, uploading supporting documentation, and the different phases of data review.	**Continue** 2 / 8 Lessons
4	**Manual Import of Data** This option allows large sets of data to be manually imported into QREST, such as when there is a gap in polling, or for those without telemetry at their site. Up to several months of hourly data can be imported at a time, and you can set up multiple import configs for different formats of data.	**Get Started** 4 Lessons
5	**Independent QA (Level 2) Data Review Training** This course covers the independent QA review required for NAAQS regulatory data, also known as Level 2 Data Review. This reviewer adds to the documentation associated with a dataset, providing a record of the independent QA review and justifications/concurrences for any invalidations.	**Get Started** 1 Lessons
6	**AQS Submission Training** This course covers submitting data, including hourly parameter data as well as QC data, from QREST to AQS.	**Get Started** 4 Lessons

Training accessed by:

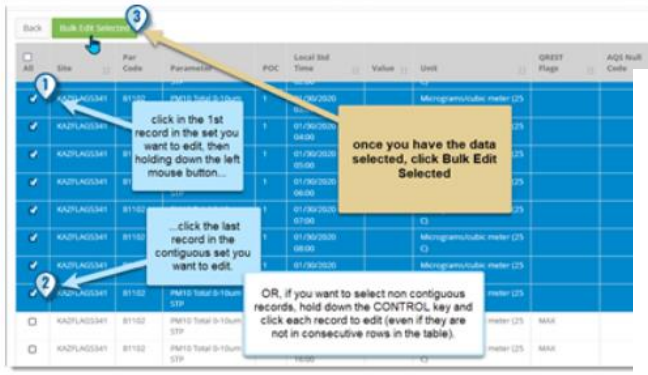
qrest.net

Don't log in, but scroll down to see:

https://qrest-test.azurewebsites.net/



Training is detailed:



7

Edit to be Suitable for AQS--Edit Data:

Once the data are selected in Data Review, click Bulk Edit Selected:

This opens up the Bulk Edit box, where appropriate AQS null codes

Air Monitoring Data Review and Final Validation Process

Procedures referenced are in http://bit.ly/QREST-SOPs

10/03/2021

automatically polled via external IP address and port #

manually imported, single or multiple parameters at once, up to 6 months at a time

START

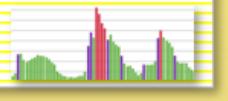
Level 0 Automatic Screening Process, *on 5 min and/or hourly data:*

Assigns flags for **Min**/**Max**, **Stuck**, **Jump**, **Lost**, as set by Tribal Agency

Level 1 Site Operator Daily and Ongoing Review:

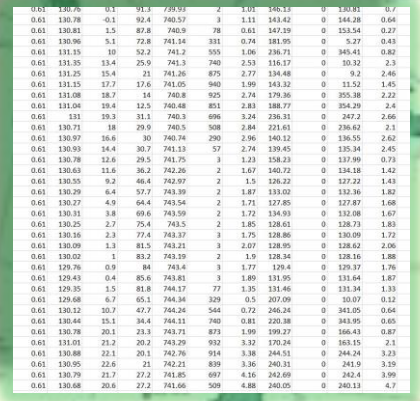
Use the Raw Data feature in QREST to review hourly data, paying emphasis to values flagged by the level 0 criteria (max, min, jump, stuck, lost). Review the 5-min (if available) data for such intervals.

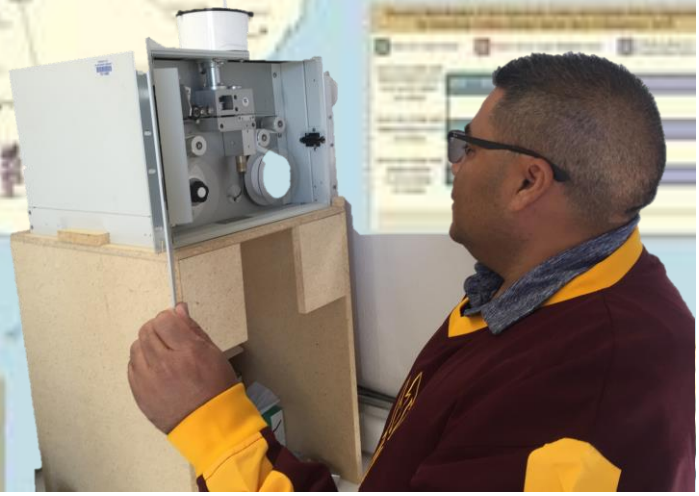
SOPs: **Level0ValidationCriteria** and **RawDataQuicklook**



Review operational stability indicators (e.g., filter loading; such indicators can be polled and charted if mapped into QREST), review intervals between maintenance, etc. See "**Operational Stability**" tab of template **Data Validation Report**.

Assign AQS null codes and AQS qualifiers, with mandatory explanatory note, for records or sets of records that are obviously invalid (or qualified), keeping in mind that the next level reviewer will need to understand the rationale. (The Level 1 Reviewer cannot change or delete any values, and any assigned AQS codes can be changed or removed in subsequent steps, if after additional investigation the records turn out to be valid. However, it saves time if obviously invalid records are marked as soon as they are identified.) SOP: **Level 1 Data Review**





E SYSTEM FOR TRIBES

Presenters

Melinda Ronca-Battista,
Tribal Air Monitoring Support Center

Melinda.Ronca-Battista@nau.edu

Resources

Tribal Air Monitoring Support Center Resources:

- TAMS Guidance on Developing Tribal Air Quality Programs
- Professional Assistance
- QREST Help Files
- One on one assistance available, and customary, especially for connecting dataloggers

NAU
NORTHERN ARIZONA UNIVERSITY

INSTITUTE for TRIBAL ENVIRONMENTAL PROFESSIONALS

Tribal Air Monitoring Support Center

Thank you for joining todays webinar!