2.51.2 Xonteck 911 Volatile Organic Compound Sampler

Section 2
OPERATOR RESPONSIBILITIES

Revision 0.0
Effective Date: 06/01/2020

1.0 Approval Sign Off Sheet

I certify that I have read and approve of the contents of _2.51.2 Xontech 911A Volatile Organic Compound Sampler_ Section 2 OPERATOR RESPONSIBILITIES, with an effective date of 06-01-2020.

Air Quality Division Director

Michael Abraczinskas

Signature: _Michael A. Abraczinskas_ Date: Jun 5, 2020

Ambient Monitoring Section Chief

Patrick Butler

Signature: _Patrick Butler_
Patrick Butler (May 29, 2020 16:12 EDT) Date: May 29, 2020

Laboratory Analysis Branch Supervisor

Jim Bowyer, Environmental Program Supervisor II

Signature: _Jim Bowyer_ Date: May 29, 2020

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Joette Steger, Environmental Program Supervisor

Signature: _Joette Steger_ Date: May 29, 2020

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Steven Walters, Chemist II

Signature: _Steven Walters_ Date: 5/29/2020

2.0 Table of Contents

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3.0 Scope and Purpose

The scope and purpose of this SOP is to describe the steps required to successfully operate the Xonteck 911 sampler used to collect volatile organic compounds in 6L Summa® canisters over a 24-hour sampling period. Bring the equipment and materials listed in **Section 4.0** with you to the UAT site, or keep them stored at the site building if room permits.

4.0 Equipment and Materials

- Xontech 911 sampler: certified and installed at the site
- 6L Summa canister(s): certified and evacuated
- NIST traceable time keeping device
- Agilent flow meter
- 4 AA Batteries for the flow meter
- Canister COC form(s) assigned to canister samples being installed and canister samples being collected.
- Canister Shipping Box
- Several COC Seals
- 9/16-inch open ended wrench
- 1/2-inch open ended wrench
- Paper clip

5.0 Detailed Procedures

5.1 Initial Canister Sample Setup

1. Upon arrival at the UAT site look for the sampler expiration date and FAS/SN number (typically located on the sampler's certification sticker). Record the FAS/SN in the "**Sampler ID#:___**" field and check the box next to the "**Exp. Date Checked**" field on the COC form.
2. If the sampler is out of certification, check the box next to the "**Exp. Date Checked**" field and add a comment such as "*sampler expired*" in the "**Comments**" field on the COC form. Inform the LAB that the sampler is expired and to schedule installation of a certified sampler.
3. Record the ADM flow meter SN in the "**Flow Meter ID#___**" field on the COC form.
4. Check expiration date to be sure the flow meter is operating within certification. Press and hold the **power/mode** button for about 3-seconds, the flow meter should turn on. Quickly press the **power/mode** button approximately 3 times until you get to the cartridge life screen. Place a check in the box next to the "**Exp. Date Checked**" field, located just below the "**Flow Meter ID#:___**" field on the COC Form.
5. Check the battery life indicator and replace the batteries if less than half full.
6. If the flow meter is out of certification, check the box next to the "**Exp. Date Checked**" field and add a comment such as *"flow meter expired"* in the "**Comments**" field on the COC form. Inform the LAB that the flow meter is out of certification and to schedule the shipment of a new, certified flow meter cartridge for the ADM flow meter.

7. Perform the Pre-Sampling Avg. Flow Check by pressing the **manual** button on the sampler timer.
8. Attached the ADM flow meter using a 9/16-inch open ended wrench to the VOC sampler as if the flow meter was a canister sample. Air flow should be travelling through the sampler to the ADM flow meter.
9. Quickly press the **power/mode** button on the ADM flow meter until **Vol (mL/min)** is displayed in the upper left corner of the ADM flow meter screen.
10. Press the **select** button. The flow meter should display up to four stored flow readings and the current reading (which will most likely be fluctuating; which is normal when reading low flow rates).
11. Press the **select** button on the flow meter enough times to clear stored flow rates. When all four flow rate fields are empty, begin taking flow rate readings approximately every ten seconds by pressing the **select** button to capture a flow rate reading. Collect four consecutive flow rate readings approximately 10 seconds apart.
12. Record the four flow rate readings in the "**#1:,#2:,#3:,#4:**" fields located next to the "**Pre-Sampling Avg Flow Check:____mL/min**" field on the COC form.
13. Keep the flow meter attached to the sampler. Calculate an AVG flow reading and record the number in the "**Pre-Sampling Avg Flow Check:____mL/min**" field on the COC form.
14. If the pre-sampling avg. flow check is outside the acceptable range, adjust the sampler flow using the flow control knob until the flow meter displays an acceptable flow rate.
15. Take four more readings and calculate an average flow. Record these values in the "**comments**" section on the COC form.
16. Remove the flow meter from the sampler.
17. Press the **manual** button again to turn off the sampler
18. Locate the sampler timer and verify the displayed time is within ±5 minutes of a NIST traceable time keeping device (cell phone, watch, or site computer connected to the internet). Place a check in the box next to the "**Timer Clock checked against NIST**" field on the COC form.
19. If the sampler time is > 5 minutes from the NIST time keeping device; place a check in the box next to the "**Timer Adjusted (Details noted in comments below)**" field on the COC form. An example comment to add to the "Comments" section on the COC form could include **"sampler time = 9:52; NIST time = 10:05; sampler time adjusted to 10:05"**
20. Visually inspect the canister COC seal to make sure the seal is intact; place a check in the box next to the "**Canister COC seal intact**" field on the COC form.
21. Verify the canister COC seal # matches the number recorded in the "**Canister COC #**" field in the **Pre-Sample (Lab)** section on the COC form; and place a check in the box next to the "**Same # as sealed**" field located just below the "**Canister COC seal intact**" field on the COC form. Note any COC seal issues in the "**Comments**" section on the COC form.
22. Break the canister COC seal and record the initials, date, and time the canister COC seal was broken in the "**Canister COC Broken by Initials, Date, & Time**" field in the **Sample Setup and Collection (Field)** section on the COC form.

23. Attach the canister to the sampler at the same point where the flow meter was removed. Finger tighten the Swagelok® nut first, then use the 9/16-inch open ended wrench to tighten the fitting. Be careful not to cross-thread the connection. ***Do not open the canister valve at this time.***

24. Perform a leak check. Turn on the VOC sampler by pressing the **manual** button. Watch the sampler pressure gauge. It should start to climb. When the sampler pressure gauge reaches approximately 10-15psi, turn off the sampler by pressing the **manual** button again. Record the reading on the sampler pressure gauge in the

Leak Check (psig) (≤ 0.1 psi over 10 min)			
Start	End	Diff.	Pass/Fail

"**Start**" field on the COC form. Wait 10 minutes. Record the reading the on the sampler pressure gauge in the "**End**" field on the COC form.   Calculate the difference between the start and end pressures and record that value in the "**Diff.**" field. Enter pass or fail in the "**Pass/Fail**" field on the COC form depending on the leak check result. See **Section 7.3** of this document for troubleshooting failing leak checks. ***Do not continue with sample setup until a passing leak check is achieved***.

25. Program the sampler timer to collect a sample from midnight to midnight on the scheduled sample date. The scheduled sample date can be derived from the "Sample #" recorded on the COC form. Example: if the Sample # is 060220M, the scheduled sample date is 06/02/2020. Use **Figure 1** below as a sampler timer button map.

Figure 1: VOC Sampler Timer Button Map
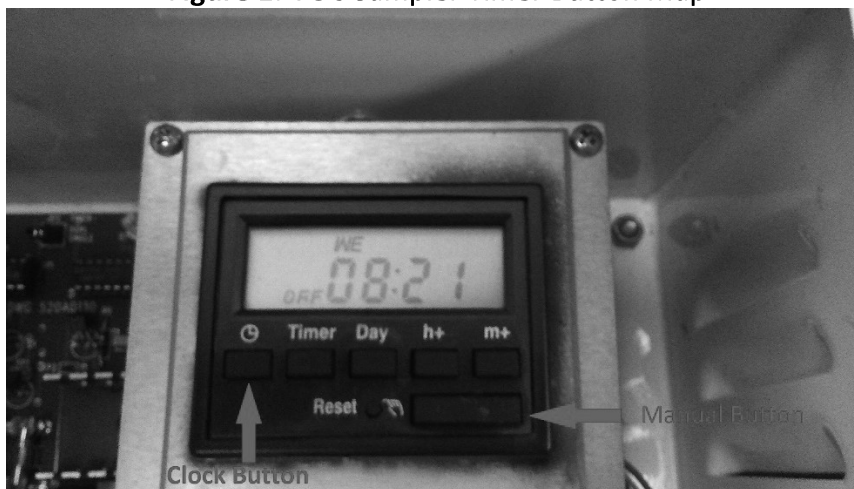
26. The sampler timer will not display a calendar date, only a day of the week and time. The day of the week will have to be derived from scheduled sample date and a calendar. In the example in step #25; the 06/02/2020 sample date falls on a Tuesday. This sample should start at midnight (00:00) on (Tuesday) 06/02/2020 and end at midnight (00:00) on (Wednesday) 06/03/2020. Another acceptable way to enter the sample end time would be (23:59) on (Tuesday) 06/02/2020.

27. Push the **Timer** button until *TIMER 1 ON* is displayed. Use the **h+** and **m+** buttons to set the time when sampling will start. Use the **Day** button to set the day of the week when sampling will start.
28. Push the **Timer** button until, **TIMER 1 OFF** is displayed. Use the **h+** and **m+** buttons to set the time when sampling will end. Use the **Day** button to set the day of the week when the sampling will end.
29. Push the **Clock** button to save the program and return to the day and time display.
30. Record the sampling date and sampling day of the week in the "**Sampling Date & Day**" field on the COC form.
31. Record the timer start time in the "**Timer Start Time**" field on the COC form
32. Record the timer end time in the "**Timer End Time**" field on the COC form.
33. Open the canister valve. Record the sampler pressure gauge reading in the "**Canister Vacuum Inches Hg (Field)**" field on the COC form.
34. Close the sampler door; and place a COC seal on the sampler door latch in a position so that if the sampler door were to be opened, the COC seal would have to be broken. Record the COC seal # in the "**Sampler COC #**" field in the **Sample Setup and Collection (Field)** section on the COC form.
35. Record the initials, date, and time in HALF of the "**Canister and Sampler COCs Sealed by Initials, Date, & Time**" field on the COC form.
36. Record additional sampling information listed in Section 6.2 of this document in the UAT site logbook.

5.2 Sampled Canister Collection

37. Upon arrival at the site visually verify the sampler COC seal is intact. Place a check in the box next to the "**Sampler COC seal intact**" field on the COC form.
38. Verify the sampler COC seal # matches the number recorded in the "**Sampler COC #**" field on the COC form. Place a check in the box next to the "**Same # as sealed**" field located just below the "**Sampler COC seal intact**" field on the COC form. If the sampler COC seal is broken note the details in the "**comments**" section on the COC form.
39. Break the sampler COC seal and record the initials, date and time in the "**Sampler COC Broken by Initials, Date, & Time**" field on the COC form.
40. Open the sampler door and record the sampler pressure gauge reading in the "**Canister Pressure (psig)**" field on the COC form.
41. Close the sampled canister valve. Remove the sampled canister using the 9/16-inch open ended wrench.
42. Place a valve cover on the sampled canister valve and add a new COC seal to the valve cover. Enter the canister COC seal # in the "**Canister COC #**" field on the COC form.
43. Record the initials, date, and time the sampled canister was COC sealed in HALF of the "**Canister and Sampler COCs Sealed by Initials, Date, & Time**" field on the COC form.
44. Perform a post sampling flow check by pressing the **manual** button on the sampler timer to turn on the sampler.
45. Attach the ADM flow meter to the sampler at the same point where the sampled canister was removed. Turn on the ADM flow meter by pressing and holding the **power/mode** button for approximately 3-seconds.

46. Quickly press the **power/mode** button until **Vol (mL/min)** is displayed in the upper left corner on the ADM flow meter display screen.
47. Press the **select** button on the ADM flow meter. Four flow rate readings should be displayed including the current flow reading. Press the **select** button enough times to clear the entries and begin taking additional flow reading for the post sampling avg. flow check.
48. Once the values are cleared, use the **select** button to record four flow readings every 10 seconds. Record the flow readings in the "**#1:,#2:,#3:,#4:**" fields located next to the "**Post-Sampling Avg Flow Check:____mL/min**" field on the COC form.
49. Calculate the AVG flow rate from these four readings and record the value in the "**Post-Sampling Avg Flow Check:____mL/min**" field on the COC form. If the AVG flow rate is outside the acceptable range adjust the flow control knob until an acceptable flow is displayed on the ADM flow meter. Take four more flow readings about 10 seconds apart and record the values in the "**#1:,#2:,#3:,#4:**" fields located next to the "**Adjusted Sampling Avg Flow Check:____mL/min**" field on the COC form.
50. Calculate the adjusted AVG flow rate from these four flow readings and record the value in the "**Adjusted Sampling Avg Flow Check:____mL/min**" field on the COC form. If no adjustment is needed record "NA."
51. Please note that if no flow adjustment is made; the four post sampling flow check values and the post sampling average flow rate value may be entered in the "**Pre-Sampling Avg Flow Check:____mL/min**" field and "**#1:,#2:,#3:,#4** fields on the *COC form assigned to the sample being **installed***.
52. Please note that if a flow adjustment is made; the four adjusted flow check values and the adjusted sampling average flow rate value may be entered in the "**Pre-Sampling Avg Flow Check:____mL/min**" field and "**#1:,#2:,#3:,#4** fields on the *COC form assigned to the sample being **installed.***
53. The Pre-Sample (Lab) section and the Sample Setup and Collection (Field) section on *COC form assigned to the sample being **collected*** should be filled out entirely at this point and must remain with the sampled canister at all times.
54. The canister shipping box will hold two canisters. When two canisters have been collected, place the canisters and their assigned COC forms in the canister shipping box. Keep the pink copy of the COC form for site records. Place the return UPS shipping label on the box and call UPS to schedule a pickup to ship the samples back to the LAB.

6.0 Records Management

Records generated during the VOC sampling process include the following:

- Lab Canister COC form (gold, pink, yellow, white)
- Monitoring Site Logbook (bound, numbered and laboratory grade)

6.1 Lab Canister COC form

This form contains four-carbonless-copies (gold, pink, yellow, and white). Upon delivery of this form and Summa canister to the regional office or designated shipping location, the gold copy should have been removed by the LAB just before shipping the canister. The bottom copy should now be pink. If the gold copy is still attached, remove it and send it back to the LAB when sampled canisters are returned to the LAB.

Take the now 3-part carbonless Canister COC form to the field to record field sampling data. Upon completion of filling out this form by the site operator, the pink copy should be removed just before shipping the sampled canister back to the LAB. The pink copy should be stored at the site operator's office or the monitoring site building. The pink copy is a back-up record of the LAB pre-sample setup data, and field site data.

Ship the yellow and white carbonless copies of the Canister COC form together with the sampled canisters in the shipping box.

6.2 Monitoring Site Logbook

This record is stored at the monitoring site. During the sample setup steps, the site operator will fill out the monitoring site logbook by initialing and dating the logbook using black or blue indelible ink. Include a brief summary of the site activities performed and results of instrument checks (if any performed). Routine site checks will be entered on the COC form. The site logbook may be used as additional space if the Canister COC form does not contain adequate space to record sampling information.

Additional site logbook entry information should include:

- Canister number
- Pre and Post Sampling avg. flow readings
- Sample date
- Starting canister vacuum
- Sampled canister pressure

Logbook entry mistakes/typos will be crossed out with a single line with the initials and date the correction was made. Use a single line across the bottom of the logbook entry to indicate the end of the entry. Any empty space between entries should be minimized, but if blank space is present, use a single line to cross out the empty space; include the initials and date the line was created. This should prevent backfilling entries in the site log books.

The site logbooks are stored at the monitoring site. The logbook entries are considered a secondary record of the sampling event. There may be instances when copies of the logbook entries may be necessary to be sent via email or stored electronically for equipment troubleshooting and data validation purposes.

7.0 Troubleshooting and Corrective Actions

The following troubleshooting and corrective action steps can be performed by the site operator in the event a VOC canister sampling issue occurs. The most common issues encountered during VOC canister sampling are discussed below.

7.1 Sampler Timer

Typically, the sampler timer buttons can get stuck from either pushing them too firmly or from dirt build-up with continued use. When attempting to reset the sampler timer, the reset button may get stuck. Using a paper clip, gently manipulate the reset button to make it un-stuck and useful again. If the reset button still does not work properly, the sample timer will have to be replaced. Call the LAB electronics technician to schedule a replacement sampler or timer.

7.2 Cross-threaded fittings

After continual usage, Summa canisters and Swagelok fittings can become worn out and/or cross-threaded. When attaching a canister to the VOC sampler, the Swagelok nut fitting should be finger tightened first, then use a wrench to snug the connection. If the fittings are cross-threaded, finger tightening will be nearly impossible. If a cross-threaded canister is suspected to be an issue, use one of the back-up canisters as a replacement. If no back up canisters are available, contact the LAB environmental specialist to request another canister shipment. Remember that if a scheduled sample date is missed, it can be made up within 30 days of the original sample date.

7.3 Failing Leak-Check

Failing leak-checks occur when the **"Diff"** field on the COC form contains a number greater than 0.1psi. Failing leak-checks are typically caused by a loose canister connection to the VOC sampler or a leaky canister valve.

If a leak-check fails, the first step is to identify the source of the leak. Either the sampler or canister is leaking. Make sure the canister valve is closed, remove the canister from the VOC sampler. Install a Swagelok plug onto the sampler line right where the canister was disconnected. Snug that fitting with two wrenches working in opposite directions.   Perform another leak check.

If the leak-check passes, the canister may be the source of the leak. If the leak check still fails, the sampler is leaking somewhere in the flow path. Call the LAB electronics technician if a failing leak check occurs using the plug. The VOC sampler may need to be serviced.

8.0 Revision History

This is revision 0.0, no revision history at this time

9.0 References

1. *Compendium Method TO-15: Determination of Volatile Organic Compounds (VOCs) In Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS)*. Center for Environmental Research Information, Office of Research and Development, U.S Environmental Protection Agency. Cincinnati, OH 45268; January 1999.
2. *Technical Assistance Document for the National Air Toxics Trends Station Program*. U.S Environmental Protection Agency Office of Air Quality Planning and Standards (C304—6). Research Triangle Park, NC 27711; October 2016, Revision 3.
3. *Xontech Model 911 Canister Sampler User Manual*. Xontech, Inc. 4009 Clipper Court, Freemont, CA, 94538.

10.0 List of Acronyms Used in this Document

COC – Chain of Custody

FAS/SN –Serial Number

L – liter

min - minute

LAB – Lab Analysis Branch

NIST – National Institute of Standards and Technology

SN –Serial Number

psi – pounds per square inch

SOP – Standard Operating Procedure

UAT – Urban Air Toxics

VOC – Volatile Organic Compound

11.0 Appendices

NC DAQ Laboratory Analysis Branch
Air Sampling Canister Chain of Custody

NC Division of Air Quality Laboratory 4403 Reedy Creek Rd Raleigh, NC 27607 (919) 733-9777	Sampling Site
	Sample #

Pre-Sample (Lab)

Canister #	Cleaning Batch #	Canister Vacuum Inches Hg (Lab)	Canister COC #	Canister COC Sealed by Initials, Date, & Time (Lab)

Sample Setup and Collection (Field)

Sampler ID#: _____   Flow meter ID#: _____   □ Sampler COC seal intact   □ Canister COC seal intact
□ Exp. Date Checked   □ Exp. Date Checked   □ Same # as sealed   □ Same # as sealed

Sampler COC Broken by Initials, Date, & Time	Canister COC Broken by Initials, Date, & Time	Canister Vacuum Inches Hg (Field)	Leak Check (psig) (≤ 0.1 psi over 10 min)			
			Start	End	Diff.	Pass/Fail

□ Timer Clock checked against NIST   □ Timer Adjusted (Details noted in comments below)

Pre-Sampling Avg Flow Check: _____ mL/min Acceptable Range: 8 mL/min to 12 mL/min (max)	#1:	#2:	#3:	#4:

Sampling Date & Day	Timer Start Time	Timer End Time	Canister Pressure (psig)	Sampler COC #	Canister and Sampler COCs Sealed by Initials, Date, & Time	
				Canister COC # 		

Post-Sampling Avg Flow Check: _____ mL/min Acceptable: 8 mL/min to 12 mL/min (max)	#1:	#2:	#3:	#4:
Adjusted Sampling Avg Flow Check: _____ mL/min Acceptable: 8 mL/min to 12 mL/min (max) (NA = No Adjustment)	#1:	#2:	#3:	#4:

Comments:

Post Sampling (Lab)

Sample Received by Initials, Date, & Time	□ Canister COC seal intact □ Same # as sealed	COC Broken by Initials, Date, & Time	Canister Pressure psig (Lab)

Comments:

Intra-Laboratory Canister Transfers

VOC Lab Relinquished by:	Date/Time:
PAMS Lab Received by:	Date/Time:

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2.51.2 Xonteck911_OPERATOR RESPONSIBILITIES_Final_052920_Signed

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By:	Steven Walters (steven.walters@ncdenr.gov)
Status:	Signed
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