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DEPARTMENT OF THE AIR FORCE
377TH AIR BASE WING (AFGSC)

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APR 10 2017
NMED
Hazardous Waste
Bureau

APR 0 3 2017

Colonel Eric H. Froehlich
377th Air Base Wing Commander
2000 Wyoming Blvd SE
Kirtland AFB NM 87117-5000

Mr. John Kieling, Bureau Chief
Hazardous Waste Bureau (HWB)
New Mexico Environment Department (NMED)
2905 Rodeo Park Drive East, Building 1
Santa Fe NM 87505-6303

Dear Mr. Kieling

This letter requests a modification to the *Work Plan for Soil Vapor Monitoring and Drinking Water Monitoring, August 2016, Solid Waste Management Unit ST-106/SS-111*, Kirtland Air Force Base (AFB), New Mexico (Work Plan) to discontinue analysis of ethylene dibromide (EDB) in soil vapor by Method California Air Resource Board (CARB) 422 for soil vapor monitoring events. EDB will continue to be analyzed in soil vapor using United States Environmental Protection Agency (EPA) Method TO-15.

The attached Summary Memorandum (Memo), documents the decision made at the Vadose Zone Working Group meeting held on 22 February 2017, that Method TO-15 would be the most effective method to analyze EDB in soil vapor. The Vadose Zone Working Group members discussed discrepancies between Method CARB 422 and Method TO-15. This Memo identifies the reports affected by this discrepancy and describes the projected path forward.

The Work Plan variance will be implemented for the 2nd Quarter 2017 sampling event. This modification, in conjunction with the previous soil vapor monitoring optimizations (NMED, 2017), further optimizes the soil vapor sampling program to target accurate data that drive project decisions, reduce data redundancy, eliminate data discrepancies, reduce cost to the public, and improve program sustainability.

If you have any questions or concerns, please contact Mr. Scott Clark at (505) 846-9017 or at scott.clark@us.af.mil or Dr. Adria Bodour at (210) 241-6276 or at adria.bodour.1@us.af.mil.

Sincerely

ERIC H. FROEHLICH, Colonel, USAF
Commander

3 Attachments:
1. Summary Memorandum documenting decisions made at Vadose Zone Working Group
2. Table 1. Sample Locations in Q4 2016 where Sample Dilutions Caused Nondetect for EDB by TO-15
3. Non-conformance Corrective Action Report from analytical laboratory

KAFB4501

cc:
NMED, Deputy Secretary (Borrego), letter
NMED-GWQB (Agnew, Hunter), letter
EPA Region 6 (Ellinger, King), letter
SAF-IEE (Lynnes), electronic only
AFCEC/CZ (Bodour, Clark, O'Grady), electronic only
USACE-ABQ District Office (Dreeland, Phaneuf, Salazar, Sanchez, Simpler), electronic only
Public Info Repository, Administrative Record/Information Repository (AR/IR) and File, hard copy

References:

NMED, 2017. Correspondence from Kathryn Roberts, Director, Resource Protection Division to Colonel Eric H. Froehlich, Base Commander, Kirtland AFB, NM, and Lieutenant Colonel Wayne J. Acosta, Civil Engineer Office, Kirtland AFB, NM, regarding Technical Memo Requesting the Optimization of Soil Vapor Monitoring, Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111, Kirtland Air Force Base, EPA ID# NM9570024423, HWB-KAFB-13-MISC. 4 January.

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Summary Memorandum:
Evaluation of Analytical Methods for Ethylene Dibromide in Soil Vapor

This Summary Memorandum (Memo) documents the discussion held at the Vadose Zone Working Group Meeting on February 22, 2017, which evaluated the relative suitability of the two analytical methods used to analyze ethylene dibromide (EDB) in soil vapor: United States Environmental Protection Agency Method TO-15 (TO-15) and California Air Resource Board Method (CARB) 422 (CARB 422). The Vadose Zone Working Group concluded that TO-15 is the most appropriate analytical method to evaluate EDB in soil vapor at the Kirtland Air Force Base Bulk Fuels Facility (BFF) release Site (Solid Waste Management Unit [SWMU] ST-106/SS-111). This conclusion was based on the following criteria:

- Detection limits for EDB by TO-15 were lower than those by CARB 422 in approximately 70% of samples collected in 2016.

- Analytical results for EDB by CARB 422 were biased approximately 1.7 times higher than those by TO-15 (soil vapor analytical results are listed in reports referenced below).

Soil vapor samples have been analyzed by TO-15 since Quarter (Q)3 2010 (Air Force Center for Engineering and the Environment [AFCEE], 2010). This analysis provides results for EDB in soil vapor in addition to 96 additional hazardous air pollutants. In Q2 2014 (United States Army Corps of Engineers [USACE], 2014), analysis for EDB by CARB 422 was added to the quarterly soil vapor sampling program to more accurately quantify EDB in areas where concentrations of other volatile organic compounds (VOCs) required the dilution of the TO-15 samples, thereby increasing the detection limits.

The objective of this Memo is to document the inconsistencies in analytical results for EDB by CARB 422 in soil vapor, document the reports affected by these inconsistencies (USACE, 2014; USACE, 2015a; USACE, 2015b; USACE, 2015c; USACE, 2015d; USACE, 2016a; USACE, 2016b; USACE, 2016c; USACE, 2016d; USACE, 2017a; USACE, 2017b), and describe the proposed path forward. This Memo represents the continuation of the collaborative efforts of the Vadose Zone Working Group to optimize soil vapor monitoring program at SWMU ST-106/SS-111.

1. Comparison of TO-15 and CARB 422 Analytical Results

Data validation was performed for CARB 422 and TO-15 as required by the project Quality Assurance Project Plan (USACE, 2016e); however, method results are not compared to each other because two different laboratory techniques and instruments were used. As part of the pending risk assessment, the analytical results of CARB 422 and TO-15 were compared. This comparison indicated that CARB 422 analytical results were biased two to five times higher than the TO-15 analytical results. The identification of this high bias drove an intensive data validation of the laboratory data packages from Q3 2015 (USACE, 2015d) and Q1 2016 (USACE, 2017a) sampling events. A detailed summary of this data validation is presented in an attachment included in the BFF Site risk assessment, and was discussed at the Vadose Zone Working Group Meeting. Key points from the investigation of EDB results in soil vapor and the intensive validation of the laboratory data packages are summarized below:

- Review of the analytical data packages indicated that the identification of EDB by TO-15 was not affected by high concentrations of other analytes such as acetone or toluene.

- Review of the analytical data packages did not provide a reason for the discrepancies between the CARB 422 and TO-15 EDB analytical data.

- The laboratory was asked to perform a direct comparison of the TO-15 and CARB 422 laboratory control samples (LCSs). When the CARB 422 LCS was analyzed by the TO-15 instrument, the sample recovery was 58%. The analysis confirmed that CARB 422 EDB results were biased about 1.7 times higher than the TO-15 results and indicated the source was the LCS preparation. This finding led to the analytical laboratory producing a Non-conformance Corrective Action Report (NCAR; Attachment 3). The NCAR states that from Q2 2015 (USACE, 2015c) to Q4 2016 (USACE, 2017a) the CARB 422 results were biased high and offered a corrective action of using the TO-15 LCS as the secondary LCS to eliminate the discrepancy between the two analytical methods.

2. Comparison of TO-15 and CARB 422 Detection Limits

Although EDB in soil vapor has been evaluated by both TO-15 and CARB 422 since 2014, CARB 422 results have been used in quarterly reports as the default analytical method to evaluate EDB (USACE, 2014; USACE, 2015a; USACE, 2015b; USACE, 2015c; USACE, 2015d; USACE, 2016a; USACE, 2016b; USACE, 2016c; USACE, 2016d; USACE, 2017a). Evaluation of the relative detection limits for each method indicates that the TO-15 dataset is the more appropriate dataset to use.

Analysis of the method detection limits (MDLs) for EDB results by both TO-15 and CARB 422 in Q1, Q2, Q3, and Q4 2016 (USACE, 2016b; USACE, 2016c; USACE, 2016d; USACE, 2017a) indicates that in 70% to 75% of samples, TO-15 has a lower MDL and is the more appropriate method. The reported MDLs for CARB 422 and TO-15 are 0.18 parts per billion by volume (ppbv) and 0.052 ppbv respectively.

However, due to dilutions of TO-15 samples with VOCs present, the detection limits can be elevated above the MDL of CARB 422. In Q4 2016 (USACE, 2017a), out of 313 samples collected, the TO-15 MDL was lower in 236 samples (75%), and the CARB 422 MDL was lower in 77 samples (25%). CARB 422 MDLs are generally lower in soil vapor monitoring points (SVMPs) that have screened intervals where VOC concentrations are the highest, causing dilution of the TO-15 samples.

TO-15 does have limitations when used in areas where the existing hydrocarbons (HC) cause sufficient dilutions to prevent the detection of EDB. If HC concentrations are sufficiently high, the required dilutions increase the detection limits for EDB by TO-15. Thus, EDB at concentrations below the detection limit will not be detected under these conditions. In Q4 2016 (USACE, 2017a), only 31 out of 284 SVMPs (11%) had detections of EDB by CARB 422, but were nondetect by TO-15 due to elevated detection limits (Table 1). HC concentrations at these SVMPs ranged from 3,000 to 27,400,000 ppbv. The SVMPs are located in and around the source area on-Base. In samples where HC concentrations are relatively low, EDB concentrations are also low, requiring relatively few dilutions to cause a nondetect for EDB. However, 21 SVMPs have HC concentrations higher than 100 ppmv. This limitation in TO-15 may justify the strategic use of CARB 422 in the source area for specific project tasks; however, any laboratory issues would need to be resolved prior to the continued use of the method.

3. Project Corrective Actions

As a result of the information presented at the Vadose Zone Working Group meeting, the Air Force recommended the discontinuation of CARB 422 for soil vapor monitoring events. The Vadose Zone Working Group concurred that the most effective and accurate method to evaluate EDB in soil vapor is by TO-15. This method will be used by the project to evaluate EDB in soil vapor moving forward. CARB 422 may be used for individual tasks where it is important to evaluate EDB in soil vapor in the presence of high concentrations of HC in relation to EDB concentrations, such as monitoring the effectiveness of bioventing or air-lifting interim measures in the source area. In these instances, CARB 422 will be included where appropriate in the individual work plan for that task. In addition, it will be verified that no discrepancies exist for any laboratory that performs EDB analysis by CARB 422.

The following ten Quarterly Reports present EDB results by CARB 422 soil vapor data in figures, tables, and text:

- Q2 and Q4 2014 (USACE, 2014; USACE, 2015a)
- Q1 through Q4 2015 (USACE, 2015b; USACE, 2015c; USACE, 2015d; USACE, 2016a)
- Q1 through Q4 2016 (USACE, 2016b; USACE, 2016c; USACE, 2016d; USACE, 2017a)

The above Quarterly Reports incorporated EDB results by CARB 422 in figures, tables, and text, and are considered qualitative analysis of EDB in soil vapor. These reports also included EDB results by TO-15 in the analytical data tables. TO-15 data should be considered more reliable than CARB 422 when reviewing these reports. In addition, the *RCRA Facility Investigation (RFI) Report BFF Release Solid Waste Management Unit ST-106/SS-111* (USACE, 2017b) presents EDB by CARB 422 for soil vapor data in figures, tables, and text.

References

AFCEE, 2010. Quarterly Remediation and Site Investigation Report July 2010 Through September 2010, Bulk Fuels Facility (ST-106) Kirtland Air Force Base, Albuquerque, New Mexico. Prepared by CH2M Hill for the HQ AFCEE/ERD Environmental Restoration Division under Contract No. FA8903-08-D-8769 Task Order No. 0096, November.

USACE, 2014. Quarterly Pre-Remedy Monitoring and Site Investigation Report for April - June 2014. Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico. Prepared by CB&I Federal Services LLC for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002. September.

USACE, 2015a. Quarterly Pre-Remedy Monitoring and Site Investigation Report for October - December 2014. Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico. Prepared by CB&I Federal Services, Inc. for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002. March.

USACE, 2015b. Quarterly Pre-Remedy Monitoring and Site Investigation Report for January- March 2015. Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico. Prepared by CB&I Federal Services, Inc. for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002. June.

USACE, 2015c. Quarterly Pre-Remedy Monitoring and Site Investigation Report for April - June 2015. Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico. Prepared by CB&I Federal Services LLC for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002. September.

USACE, 2015d. Quarterly Pre-Remedy Monitoring and Site Investigation Report for July-September 2015. Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico. Prepared by CB&I Federal Services LLC for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002. December.

USACE, 2016a. Quarterly Pre-Remedy Monitoring and Site Investigation Report for October - December 2015. Solid Waste Management Units ST-106 and SS-111, Kirtland Air Force Base, Albuquerque, New Mexico. Prepared by CB&I Federal Services LLC for the USACE Albuquerque District under USACE Contract No. W912DY-10-D-0014, Delivery Order 0002. March.

USACE, 2016b. Quarterly Report – January-March 2016 Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111 Kirtland Air Force Base, New Mexico. Prepared by EA Engineering, Science, and Technology, Inc., for the USACE Albuquerque District under PBC Contract No. W912DR-12-D-0006 Delivery Order DM01. June.

USACE, 2016c. Quarterly Report – April-June 2016 Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111 Kirtland Air Force Base, New Mexico. Prepared by EA Engineering, Science, and Technology, Inc., for the USACE Albuquerque District under PBC Contract No. W912DR-12-D-0006 Delivery Order DM01. September.

USACE, 2016d. Quarterly Report – July-September 2016 Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111 Kirtland Air Force Base, New Mexico. Prepared by EA Engineering, Science, and Technology, Inc., for the USACE Albuquerque District under PBC Contract No. W912DR-12-D-0006 Delivery Order DM01. December.

USACE, 2016e. Work Plan for Soil Vapor Monitoring and Drinking Water Monitoring, Solid Waste Management Unit ST-106/SS-111. Prepared by Sundance Consulting, Inc. for USACE–Albuquerque District. August 16.

USACE, 2017a. Quarterly Report – October-December 2016 Bulk Fuels Facility Solid Waste Management Unit ST-106/SS-111 Kirtland Air Force Base, New Mexico. Prepared by EA Engineering, Science, and Technology, Inc., for the USACE Albuquerque District under PBC Contract No. W912DR-12-D-0006 Delivery Order DM01. March.

USACE, 2017b. RCRA Facility Investigation Report BFF Release Solid Waste Management Unit ST-106/SS-111. Prepared by Sundance Consulting Inc. for the USACE Albuquerque District under USACE contract No. W912PP-16-C-002. February.

Table 1. Sample Locations in Q4 2016 where Sample Dilutions Caused a Nondetect for EDB by TO-15

Soil Vapor Monitoring Point	Sample Date	Hydrocarbons (ppbv)	CARB 422 Results				TO-15 Results			
			Result (ppbv)	MDL (ppbv)	RL (ppbv)	Dilution Factor	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Dilution Factor
SVEW-06-60[A]	10/11/16	4,610,000	60	0.4	0.78	1.55	ND	160	500	7750
SVEW-07-160[A]	10/13/16	26,040,000	36	0.41	0.79	1.57	ND	2500	7900	121000
SVMW-02-150[A]	10/12/16	394,000	5.6	0.44	0.84	1.68	ND	14	44	672
SVMW-03-300[A]	10/10/16	5,000	1.2	0.42	0.82	1.63	ND	0.48	1.5	23.3
SVMW-04-50[A]	10/10/16	279,000	11	0.43	0.82	1.64	ND	14	43	656
SVMW-05-100[A]	10/10/16	13,760,000	530	0.43	0.83	1.65	ND	570	1800	27500
SVMW-06-250[A]	10/10/16	15,540,000	44	0.42	0.81	1.62	ND	670	2100	32400
SVMW-07-300[A]	10/10/16	511,000	5.9	0.43	0.84	1.67	ND	14	43	668
SVMW-08-50[A]	10/12/16	8,120,000	38	0.42	0.8	1.6	ND	220	690	10700
SVMW-09-250[A]	10/12/16	10,960,000	680	0.42	0.82	1.63	ND	340	1100	16300
SVMW-09-50[A]	10/10/16	102,000	1.7	0.45	0.87	1.73	ND	7.2	23	346
SVMW-10-150[A]	10/10/16	27,400,000	2700	87	170	334	ND	990	3100	47700
SVMW-10-250[A]	10/10/16	12,440,000	790	0.44	0.86	1.71	ND	450	1400	21400
KAFB-106110-250[B]	10/14/16	55,000	1.2	0.44	0.85	1.69	ND	2.3	7.3	113
KAFB-106111-250[B]	10/14/16	489,000	6	0.41	0.8	1.59	ND	14	43	663
KAFB-106112-350[B]	10/14/16	69,000	5.7	0.42	0.82	1.63	ND	2.3	7.1	109
KAFB-106115-450[B]	10/5/16	853,000	3	0.44	0.86	1.71	ND	36	110	1710
KAFB-106116-250[B]	10/5/16	144,000	8.1	0.42	0.81	1.61	ND	21	65	1010
KAFB-106117-450[B]	10/6/16	4,660,000	470	0.42	0.81	1.61	ND	170	520	8050
KAFB-106119-350[B]	10/11/16	1,233,000	24	0.43	0.83	1.65	ND	23	72	1100
KAFB-106128-50[B]	10/6/16	52,000	1.3	0.4	0.78	1.55	ND	1.6	5	77.5
KAFB-106130-50[B]	10/11/16	5,000	0.53 J	0.43	0.83	1.66	ND	0.58	1.8	27.7
KAFB-106131-450[B]	10/5/16	47,000	5.3	0.44	0.85	1.7	ND	5.1	16	243
KAFB-106133-450[B]	10/17/16	34,000	1	0.43	0.83	1.66	ND	0.69	2.2	33.2
SVEW-10-410[B]	10/12/16	3,000	0.48 J	0.42	0.81	1.62	ND	0.48	1.5	23.1
SVEW-11-410[B]	10/12/16	72,000	1.7	0.45	0.87	1.73	ND	2.4	7.5	115
SVMW-01-100[B]	10/10/16	4,550,000	3	0.58	1.1	2.24	ND	70	220	3340
SVMW-02-250[B]	10/10/16	169,000	8.6	0.43	0.82	1.64	ND	5.7	18	273
SVMW-06-252[B]	10/10/16	538,000	27	0.45	0.86	1.72	ND	100	320	4910

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Soil Vapor Monitoring Point	Sample Date	Hydrocarbons (ppbv)	CARB 422 Results				TO-15 Results			
			Result (ppbv)	MDL (ppbv)	RL (ppbv)	Dilution Factor	Result (ppbv)	MDL (ppbv)	RL (ppbv)	Dilution Factor
SVMW-13-150[B]	10/12/16	1,133,000	31	0.45	0.87	1.73	ND	12	38	577
SVMW-15-250[B]	10/11/16	8,000	0.78	0.44	0.84	1.68	ND	0.58	1.8	28

[A]SVMP is located inside the source area on-Base
[B]SVMP is located on-Base, outside the source area
CARB = California Air Resources Board
EDB = ethylene dibromide
KAFB = Kirtland Air Force Base
MDL = method detection limit
ND = nondetect
ppbv = parts per billion by volume
Q = quarter
RL = reporting limit
SVEW = soil vapor extraction well
SVMW = soil vapor monitoring well
TO = toxic organic compound

ALS Laboratory Group **Non-Conformance Corrective Action Report**

Non Conformity Observation

NCAR ID: SV0496 **Event:** Client Complaint

Description: CARB 422 - EDB Data biased high

Instrument: GC21 **Method:** **Lab:** Simi Valley

Issued To / Department: SVOA **Date Issued:** 01/17/2017 **Initiator:** Evelyn Alvarez

Non Conformance Type: Client Complaint

Nonconformance Type (Other):

Responsible Party : Evelyn Alvarez **Response Due Date:** 01/17/2017

WorkOrder(s): Sundance/CBI Kirtland AFB project

Non-Conformance Details:

Sundance/CBI had a risk assessment by a third party data validator (Neptune). Their investigation found that the 'CARB 422 EDB results for EDB are 1 to 6 times higher than the TO-15 results across the board'. After running the CARB 422 standard by TO15 and running the TO15 standard by CARB 422 we found that the CARB 422 standard was lower (about 40%). A new CARB 422 standard was prepared and a new curve was run with the new standard. When the old standard was run against the new curve it was lower confirming the TO15 data. The TO15 standard was also run against the new curve and the recovery was spot on, thus confirming that the new standard concentration was accurate. Since the CARB 422 standard was low and that standard had been used to calibrate, the reported sample results were biased high.

Issue began with ICAL analyzed 03/20/15 using standard S28-03191504 (preparation technique error). CARB 422 1,2-EDB data in Sample Runlog SVOA GC No.21, Log No.6 analyzed between 03/20/15 and 11/09/16 affected. Laboratory has only received samples from this one client for this method/analyte combination.

Samples analyzed with the previous ICAL (CARB_12EDB_052114.M) were not affected. Verified that new standards were prepped and matched ICAL while it was in use (ex. CCV S28-01131503).

Initial Response Timeline: 01/24/2017

Corrective Action Findings and Response

Identify Root Cause: Lack of analyst training/knowl **CAP Implementation Timeline:** 01/27/2017

Details: Both the primary and secondary standards that were being used were biased low. When the ICAL was run, it was not known that they were biased low because they matched each other. The preparation technique seems to be the problem. Additionally the standards were assigned a 2 year expiration. Although this is not incorrect (per the Consumable Materials SOP) and the standard did not degrade over time; the problem would not have gone on for as long if it had been a shorter expiration date.

Corrective Action Plan(CAP): The primary standard will be continued to be made in the same manner, but the TO15 Standard will be used as the secondary. This will compare two

	different source types: liquid neat standard and gas-phase standard mix as well as comparing two different preparation techniques. If there is an issue with preparation technique it will be noticed. Additionally the expiration date will be lowered to one year.
CAP Completion Details:	Changes noted above were added to an SOP change form. All analysts running the method signed a training sheet noting that they are aware of the changes.

Respondent: Evelyn Alvarez **Date :** 01/26/2017

Supervisor Verification : Wade Henton **Date :** 01/26/2017

Notification -Customer/Client - Internal/External (As Needed)

Action Taken to handle Out of control Data :

The client was notified via email and discussed over the phone.

Project Manager Notified? YES **Date :** 01/10/2017

Customer Notification Necessary : YES **Date :** 01/17/2017

Report Revision Necessary: **Date :**

Notifier: Kate Kaneko **Date :**

Acceptance of Completed Corrective Action by QA

QA Signature : Chaney Humphr **Date :** 01/26/2017

QA Comments : Documentation attached.

Recurring Nonconformance : **ID Previous Nonconformance :** 0

Verification of Completed Corrective Action by QA

Verifier: Chaney Humphr **Date :** 01/26/2017

Comments : SOP change form attached to SOP. Training completed. See attached documentation.

MISCELLANEOUS TRAINING FORM

Topic:	NCAR SV0496 Training
	Describe training performed: Reviewed SOP Change Form (attached) added to address NCAR SV0496.

Date:	01/26/17	
Trainer:	Evelyn Alvarez	
Attendees:	**Printed Name**	**Signature**
	Zheng Wang	
	Gilbert Gutierrez	

SOP CHANGE FORM

SOP Title: Analysis of Halogenated Volatile Organic Compounds in Emissions from Stationary sources using Gas Chromatography with Electron Capture Detection in accordance with a modification of CARB Method 422
SOP Code: SVO-CARB422
SOP Revision No.: 05.0
SOP Date: 04/25/2015
SOP Section(s) Affected by Change: 10.4, 11.1.4, 12.5

Description of Change: 10.4 add - Prepared gas phase standards made into canisters will be given a one year expiration 11.1.4 add - ICV standard used shall be a TO15 Standard 12.5 add - LCS shall be an injection of a TO15 Standard

Reason(s) for Change(s): Corrective Action Plan from NCAR

Change(s) Submitted by: Evelyn Alvarez	Date: 01/25/2017

Approvals:

QA Manager Signature:	Date: 1/26/17
Supervisor/Manager Signature:	Date: 1/25/17

Change(s) Effective Date: 1/27/17

Distribution: Original filed with original SOP
Copy attached to each controlled copy

Complete on hardcopy filed with original SOP
Verified electronic copy attached: ☐