Quality Assurance Report

"Bucket Brigade" Community Air Sampling Pilot Project

March, 1998

Written by
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The Bucket Brigades are a collaborative project of:

Contra Costa Health Services Director's Office,
Contra Costa Health Services Hazardous Materials Division,
Communities for a Better Environment (San Francisco),
West County Toxics Coalition (West County),
People Do! (Richmond),
Healthy Neighborhoods Project (West County)
Rodeo Citizen's Association,
Shoreline Environmental Association (West County),
Communities for a Safe Environment (Martinez), and
Community Abatement of Pollution – Industrial Toxins (CAP-IT, East County)

Table of Contents

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The contents of this plan, excepting appendices, will also be distributed to the Bucket Brigade Working Group:

Henry Clark, West County Toxics Coalition
Sarah Eeles, People Do!
Sheryl Walton, Healthy Neighborhoods Project
Kenny Lukas, Rodeo Citizen's Association
Kasha Kessler, Shoreline Environmental Association
Ralph Sattler, Communities for a Safe Environment
Paulette Lagana, Community Abatement of Pollution – Industrial Toxins
AND to Community Bucket Coordinators for each area in the project:

Richmond area: Sarah Eeles
Crockett/Rodeo area: Sandra Dare, Shoreline Environmental Association
Martinez/N. Concord/Clyde area: Terry Decosta, CBE, CSE
East County: Paulette Lagana, CAP-IT

A. Overview

Since August, we (the technical committee: Schuyler Fishman, formerly Jeff Hobson, and now Jim Gallagher) have completed three QA/QC tests. The tests occurred on August 26, 1998 at the Tosco fence-line in Rodeo, on September 23, 1998 at Sarah Eeles house in Richmond, and on December 21, 1998 in Martinez on Pacheco Blvd at the Shell gas station. All analysis for both summa canisters and tedlar bags was performed at EPA region IX laboratory, by Barbara Bates. More detailed information about the QA/QC test is included in reports issued by Barbara Bates of the Region IX EPA lab, please contact Schuyler if you need a copy of these reports. These tests are comprised of the following procedures.

Field Blanks.

To check for contamination in field methods and the consistency of laboratory analyses, the project will include periodic field blanks. When we do the QA/QC we fill a Tedlar bag with pure nitrogen and bring it with us while we do other tests before delivering it to the lab for analysis. We do this to test for "permeation" of chemical contaminants that might happen after the sampler has taken a sample. If this happens the results that come back from the lab might not reflect what was in the air at all, but contaminants that enter the bag after (or before) a sample is taken. Results from lab blanks are used to determine the baseline contamination levels for data interpretation.

Comparative testing with summa canisters.

With the assistance of the EPA Region IX's air toxics laboratory, the project will also contribute to the state of knowledge about the comparative validity of different sampling techniques and technologies. In these tests we put a bucket next to a summa canister outside and take samples at the same time to check to see if the results are comparable. If the "Relative Percent Difference (RPD)"[*] * of the bucket results and summa canister results for a given chemical is less than 50% than we know we are measuring the chemical with some accuracy.

Bucket Field Duplicates.

To check contamination in field methods and the consistency of laboratory analyses, the project will include periodic field duplicates. During a field duplicate, we take two samples at once, using two separate bucket samplers. This is to make sure the bucket samplers sample the air consistently with each other. If the "Relative Percent Difference"(RPD)* of both bucket results for a given chemical is less than 50% than we know we are measuring the chemical with some accuracy.

Performance Certification.

We had the EPA Region IX laboratory make a "Performance Evaluation sample" (PE sample) which is a sample with a know concentration of several gasses we might often find in our bucket samples. We then send the bag to Air Toxics and Performance Analytical. If the ratio of the known concentration and the result from the lab are between 70% and 100% we know our laboratory is reasonably accurate. Because of a mix up with Performance Analytical, they did not receive the "PE sample." We compared the results from EPA lab and Air Toxics to see how accurately they measured the know amount of chemicals.

B. Results from QA/QC Samples

Field Blanks.

After completing analysis on 5 field blanks including the 3 done during region IX tests we identified some common contaminates. Several compounds, specifically: **Toluene, Acetone, Ethanol, and 2-Propanol**, have been found in the field blanks and may be common bag contaminants. Bucket results for these chemicals will have to be flagged and not considered significant unless the concentration is 5x greater than the average amount found in the field blanks. **Methylene Chloride** has also been found in Field Blanks but is also a common lab contaminant. See **Table 1**. below for specific contamination levels.

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[*] Relative Percent Difference (RPD) is a method of determining if the results are comparable. RPD = (Result #1 - Result #2) / Average of Result #1 - Result #2

Some of this contamination might come from glue in the Fed-Ex box. A recent field blank which was NOT transported in a Fed-Ex box was completely free of contamination. Schuyler is doing a follow up study.

Table 1. Average contamination level for chemicals found in all field blanks. Non-detect results and results below detection limits were not included in the calculation. Samples from Region IX results and from the pilot study conducted by Jeff Hobson were included in this calculation.

Contaminants which will be flagged "Y" if less than 5X the common contamination level	
Chemical Name	**Common Contamination Level (ppb)**
Toluene	8.58
Acetone	7.75
Ethanol	5.2
2- Propanol	4.2

Comparative testing with summa canisters.

QA/QC tests were NOT done in areas where there was a substantial concentration of pollutants. In order to calculate the RPD and yield conclusive results! We need to have chemical concentrations exceed 5 times the minimum amount that the lab can detect (1 ppb) in order to determine if the field duplicates and side by side test with the summa canisters are relevant. We will do the next QA/QC test in the Hazardous Materials Laboratory where will create a controlled contaminated atmosphere to make sure the QA/QC test results are conclusive.

Bucket Field Duplicates.

As mentioned above, the results were not significantly above the minimum detect level to be conclusive for most chemicals. However, Toluene and Methlyene Chloride which were both common contaminates and present in lab blanks were often at levels that were above five time the detection limit. These chemicals did not meet the RPD requirement in these cases and will be flagged accordingly in the data interpretation.

Performance Certification.

The lab Performance Certification was completed and considered to adequately assure the quality of our analytical lab, Air Toxics. However, **Toluene** was measured by both the EPA lab and Air Toxics at a level significantly higher that was actually in the sample. Toluene will be flagged in all bucket results and should be considered a rough estimate. **Methylene Chloride** results were also found to be exagerated in both the Air Toxics and EPA analysis, but at more reasonable levels. This compound will also be flagged in future samples. **1.1.2.2.-Tetrachloroethane and 1,2-Dicholobenzene** were found at lower levels than we actually in the "PE sample." These chemicals will also be flagged in future results. There were also common contaminants found in the PE sample at levels comparable to those expected from our field blanks. See **Table 2** for a summary of the Performance Evaluation Results. Because they had recently moved without notification, the Performance Evaluation sample did not reach Performance Analytical laboratory. Region IX has agreed to do one PE test for us a year. To fairly evaluate if Performance Analytic is a viable option, we need to ask Region IX if they will complete another PE sample for us in 1999. This may also be necessary if Schuyler identifies that the Fed Ex boxes are a source of contamination.

Table 2. Results from the Performance Evaluation Test

COMPOUND NAME	***EXPECTED VALUE***	***AIR TOXICS RESULTS***		***EPA RESULTS***	
	PPB	PPB	PERCENT RECOVERY	PPB	PERCENT RECOVERY
Vinyl Chloride	11.6	11	95%	11	95%
Freon 11	11.6	13	112%	13	112%
Methylene Chloride	11.7	21	**179%**	17	**145%**
Carbon Tetrachloride	11.4	13	114%	10	88%
Trichloroethene	11.4	13	114%	13	114%
Toluene	11.6	52	**448%**	31	**267%**
1,1,2,2-Tetrachloroethane	11.1	6.3	**57%**	7	**63%**
1,2-Dichlorobenzene	11.8	3.4	**29%**	5	**42%**
Unexpected Results					
Acetone	0	8.6	n/a		n/a
2-Propanol	0	7.5	n/a		n/a
2-Butanone	0	6.5	n/a		n/a
Ethanol	0	4.3	n/a		n/a
m,p-Xylene	0	0.9	n/a		n/a
Styrene	0	2.6	n/a	2	n/a

Sulfur testing

Region IX can not perform analysis on sulfur compounds for our QA/QC purposes. In order to do some assessment for the accuracy of our sulfur analysis we did take a side by side field duplicate on December 21, 1998 and drove it to Air Toxics for Sulfur analysis. However, the results were non-detect for every compound.

C. Next Steps

As per out Quality Assurance and Quality Control plan, we will continue to do Field Blanks, Field Duplicates, and side by side tests with help from Region IX EPA. Our goal is to rotate communities where we test the buckets so we may cover all the areas. For our next QA/QC test in February we will perform Field Duplicates with buckets from the Pittsburg area and we will sample known chemicals in the controlled environment of the Hazardous materials division laboratory. Schuyler will also complete her study on the Fed-Ex boxes this month.

D. Enclosures

Richmond EPA Region IX lab report and data.