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## Central Valley Regional Water Quality Control Board

**TO:** Clay L. Rodgers  
Assistant Executive Officer

Dale W. Harvey  
Supervising Engineer

**FROM:** Joshua G. Mahoney  
Water Resource Control Engineer

**DATE:** 29 March 2017

**SUBJECT: NOTES FOR COLLECTION OF CITRUS FRUIT SAMPLES IRRIGATED WITH  
BLENDED PRODUCED WASTEWATER IN CAWELO WATER DISTRICT**

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff observed the collection of citrus samples (i.e., navels, mandarins, and lemons) by Advanced Environmental Concepts, Inc., a third party consulting group collecting samples on behalf of Cawelo Water District. Central Valley Water Board staff (Staff) obtained ownership of all citrus samples throughout the sampling event. Citrus samples were shipped, via FedEx overnight delivery, to Weck Laboratories, Inc., for analysis.

### PRESENT PARTIES

**Project Manager and Field Staff from Advanced Environmental Concepts, Inc. (AEC)**

**District Manager and Superintendent from Cawelo Water District (Cawelo)**

**Central Valley Regional Water Quality Control Board (Central Valley Water Board)**

- W. Dale Harvey, Supervising Engineer
- Joshua Mahoney, Water Resource Control Engineer

**University of the Pacific (UOP)**

- Dr. William Stringfellow, Professor and Director
- Ben Grafius, Graduate Assistant for Dr. Stringfellow (Science Advisor)

### GENERAL SAMPLING PROCEDURES

Equipment:

1. Nitrile gloves
2. Wipes
3. Mason jars (hereafter sample container)
4. Ice chests

Fruit Handling:

1. Nitrile gloves were used while handling fruit.

2. Cut fruit vine with trimmers.
3. Wipe the fruit.
4. Place the fruit in the sample container.
5. Seal the container and tape the lid.
6. Sample containers remain in the ice chest until delivered to the laboratory.

Fruit Selection Criteria:

1. Minimum distance from main road was five tree rows.
2. Minimum distance from access road was six trees.
3. Samples collected from the same tree were picked from different branches.
4. All samples were ripe.
5. No unfavorable features or colors.
6. The rind was not damaged or peeled prior to being received by Weck Laboratories, Inc.
7. Samples were representative of the fruit an average consumer would find at a store.

**SAMPLE SITES**

Site 1

Site Name: Wastewater-1\_Mandarin-1  
Fruit Type: Mandarin  
Fruits per Sample Container: 3-4

Sample Containers per Tree: 1  
Tree Row: 21 (from the east)  
Tree Count from the road: 8, 9, and 10

Sample Time for AEC: 09:15 and 09:20 (duplicate)

Sample Names:

A-M-1 (AEC sample)  
A-M-11 (AEC duplicate sample)  
Treat-1 (UOP sample)

Notes: Duplicate samples were collected from the same trees.

Site 2

Site Name: Wastewater-2\_Navel-1  
Fruit Type: Navel  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 13 (from the north)  
Tree Count from the road: 12, 13, and 15

Sample Time: 09:51

Sample Names:

A-O-1 (AEC sample)  
Treat-2 (UOP sample)

Notes: Tree 14 was skipped due to available fruits too large for the sample container.

Site 3

Site Name: Wastewater-3\_Mandarin-2  
Fruit Type: Mandarin  
Fruits per Sample Container: 4

Sample Containers per Tree: 1  
Tree Row: 15 (from the east)  
Tree Count from the road: 8, 9, and 10

Sample Time: 10:22

Sample Names:

A-M-2 (AEC sample)  
Treat-3 (UOP sample)

Notes: NA

Site 4

Site Name: Wastewater-4\_Lemon-1  
Fruit Type: Lemon  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 14 (from the west)  
Tree Count from the road: 6, 7, and 8

Sample Time: 10:55

Sample Names:

A-L-1 (AEC sample)  
A-L-11 (AEC duplicate sample)  
Treat-4 (UOP sample)

Notes: Duplicate samples were collected from the same trees.

Site 5

Site Name: Wastewater-5\_Lemon-2  
Fruit Type: Lemon  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 10 (from the west)  
Tree Count from the road: 7, 8, and 9

Sample Time: 11:36

Sample Names:

A-L-2 (AEC sample)  
Treat-5 (UOP sample)

Notes: Samples collected from an organic farm.

Site 6

Site Name: Wastewater-6\_Navel-2  
Fruit Type: Navel  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 7 (from the west)  
Tree Count from the road: 7, 8, and 13

Sample Time: 12:05

Sample Names:

A-O-2 (AEC sample)  
Treat-6 (UOP sample)

Notes: Fruit and trees had a white film from a recent spray event.  
Trees 9, 10, 11, and 12 were skipped due to the limited selection available.  
Trees were recently picked.

Site 7

Site Name: Wastewater-7\_Mandarin-3  
Fruit Type: Mandarin  
Fruits per Sample Container: 3-4

Sample Containers per Tree: 1  
Tree Row: 9 (from the east)  
Tree Count from the road: 10, 11, and 12

Sample Time: 12:57

Sample Names:

A-M-3 (AEC sample)  
Treat-7 (UOP sample)

Notes: One fruit sample container had three mandarins due to the size of the fruit.

Site 8

Site Name: Wastewater-8\_Lemon-3  
Fruit Type: Lemon  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 14 (from the east)  
Tree Count from the road: 7, 8, and 9

Sample Time: 13:19

Sample Names:

A-L-3 (AEC sample)  
Treat-8 (UOP sample)

Notes: NA

Site 9

Site Name: Wastewater-9\_Navel-3  
Fruit Type: Navel  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 10 (from the north)  
Tree Count from the road: 6, 8, 10, and 11

Sample Time: 13:55

Sample Names:

A-O-3 (AEC sample)  
A-O-11 (AEC duplicate sample)  
Treat-9 (UOP sample)

Notes: Duplicate samples were collected from the same trees.  
An additional tree was required due to the limited fruit available on Tree 10.  
White film was observed on all trees and fruit.

**SITE PHOTOS**

TIME STAMP ON PICTURES IS ONE HOUR FAST

Site 1 – Mandarin Tree



Site 4 – Lemon Tree



Site 9 – Navel Tree



Site 3 – Collecting Fruit Samples



Site 6 – Cleaning Fruit



Site 9 – Sealing Sample Containers



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## Central Valley Regional Water Quality Control Board

**TO:** Clay L. Rodgers  
Assistant Executive Officer

Dale W. Harvey  
Supervising Engineer

**FROM:** Joshua G. Mahoney  
Water Resource Control Engineer

**DATE:** 30 March 2017

**SUBJECT: NOTES FOR COLLECTION OF CITRUS FRUIT SAMPLES IRRIGATED WITH NON-PRODUCED WASTEWATER NEAR CAWELLO WATER DISTRICT**

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff observed the collection of citrus samples (i.e., navels, mandarins, and lemons) by Advanced Environmental Concepts, Inc., a third party consulting group collecting samples on behalf of Cawelo Water District. Central Valley Water Board staff (Staff) obtained ownership of all citrus samples throughout the sampling event. Citrus samples were shipped, via FedEx overnight delivery, to Weck Laboratories, Inc., for analysis.

### PRESENT PARTIES

**Project Manager and Field Staff from Advanced Environmental Concepts, Inc. (AEC)**

**District Manager and Superintendent from Cawelo Water District (Cawelo)**

**Central Valley Regional Water Quality Control Board (Central Valley Water Board)**

- W. Dale Harvey, Supervising Engineer
- Joshua Mahoney, Water Resource Control Engineer

**University of the Pacific (UOP)**

- Ben Grafius, Graduate Assistant for Dr. Stringfellow (Science Advisor)

### GENERAL SAMPLING PROCEDURES

Equipment:

1. Nitrile gloves
2. Wipes
3. Mason jars (hereafter sample container)
4. Ice chests

Fruit Handling:

1. Nitrile gloves were used while handling fruit.
2. Cut fruit from tree with trimmers.

3. Wipe the fruit.
4. Place the fruit in the sample container.
5. Seal the container and tape the lid.
6. Sample containers remain in the ice chest until delivered to the laboratory.

Fruit Selection Criteria:

1. Minimum distance from main road was five tree rows.
2. Minimum distance from access road was six trees.
3. Samples collected from the same tree were picked from different branches.
4. All samples were ripe.
5. No unfavorable features or colors.
6. The rind was not damaged or peeled prior to being received by Weck Laboratories, Inc.
7. Samples were representative of the fruit an average consumer would find at a store.

**SAMPLE SITES**

Site 1

Site Name: Control-1\_Mandarin-1  
Fruit Type: Mandarin  
Fruits per Sample Container: 3

Sample Containers per Tree: 1  
Tree Row: 11(from the east)  
Tree Count from the road: 6, 7, and 8

Sample Time for AEC: 08:39

Sample Names:

B-M-1 (AEC sample)  
B-M-11 (AEC duplicate sample)  
Control-1 (UOP sample)

Notes: Irrigation water from Southern San Joaquin Municipal Utility District.  
Trees were recently picked.  
All samples contained three mandarins due to fruit size.

Site 2

Site Name: Control-2\_Mandarin-2  
Fruit Type: Mandarin  
Fruits per Sample Container: 4

Sample Containers per Tree: 1  
Tree Row: 10 (from the east)  
Tree Count from the road: 8, 9, and 10

Sample Time: 09:41

Sample Names:

B-M-2 (AEC sample)  
Control-2 (UOP sample)

Notes: Irrigation water from Ducor Irrigation District.

Site 3

Site Name: Control-3\_Lemon-1  
Fruit Type: Lemon  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 17 (from the west)  
Tree Count from the road: 7, 8, and 10

Sample Time: 10:07

Sample Names:

B-L-1 (AEC sample)  
Control-3 (UOP sample)

Notes: Trees were recently picked.  
Irrigation water from Ducor Irrigation District and irrigation wells.

Site 4

Site Name: Control-4\_Mandarin-3  
Fruit Type: Mandarin  
Fruits per Sample Container: 4

Sample Containers per Tree: 1  
Tree Row: 11 (from the east)  
Tree Count from the road: 7, 8, and 9

Sample Time: 10:30

Sample Names:

B-M-3 (AEC sample)  
Control-4 (UOP sample)

Notes: Irrigation water from Ducor Irrigation District and irrigation wells.

Site 5

Site Name: Control-5\_Navel-1  
Fruit Type: Navel  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 38 (from the east)  
Tree Count from the road: 3 and 4

Sample Time: 10:52

Sample Names:

B-O-1 (AEC sample)  
B-O-11 (AEC duplicate sample)  
Control-5 (UOP sample)

Notes: Trees were recently picked. Only fruit on trees 3 and 4.  
Irrigation water from Ducor Irrigation District and irrigation wells.

Site 6

Site Name: Control-6\_Navel-2  
Fruit Type: Navel  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 13 (from the north)  
Tree Count from the road: 6, 7, and 8

Sample Time: 11:36

Sample Names:

B-O-2 (AEC sample)  
Control-6 (UOP sample)

Notes: Irrigation water from Terra Bella Water District.

Site 7

Site Name: Control-7\_Lemon-2  
Fruit Type: Lemon  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 6 (from the south)  
Tree Count from the road: 5, 6, and 8

Sample Time: 12:05

Sample Names:

B-L-2 (AEC sample)  
B-L-11 (AEC duplicate sample)  
Control-7 (UOP sample)

Notes: Trees were recently picked. No fruit on tree 7.  
Irrigation water from Terra Bella Water District.

Site 8

Site Name: Control-8\_Lemon-3  
Fruit Type: Lemon  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 6 (from the west)  
Tree Count from the road: 6, 7, and 8

Sample Time: 13:04

Sample Names:

B-L-3 (AEC sample)  
Control-8 (UOP sample)

Notes: Irrigation water from Vandalia Irrigation District.

Site 9

Site Name: Control-9\_Navel-3  
Fruit Type: Navel  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 5 (from the west)  
Tree Count from the road: 7, 8, and 9

Sample Time: 13:18

Sample Names:

B-O-3 (AEC sample)  
Control-9 (UOP sample)

Notes: Irrigation water from Vandalia Irrigation District.  
Trees were recently picked.

### SITE PHOTOS

TIME STAMP ON PICTURES IS ONE HOUR FAST

Site 1 – Navel Tree



Site 2 – Mandarin Tree



Site 8 – Lemon Tree



Site 4 – Selecting Fruit Samples



Site 1 – Cleaning Fruit



Site 9 – Fruit Sample Containers



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## Central Valley Regional Water Quality Control Board

**TO:** Clay L. Rodgers  
Assistant Executive Officer

Dale W. Harvey  
Supervising Engineer

**FROM:** Joshua G. Mahoney  
Water Resource Control Engineer

**DATE:** 4 April 2017

**SUBJECT: NOTES FOR COLLECTION OF CITRUS FRUIT SAMPLES IRRIGATED WITH PRODUCED WASTEWATER IN KERN-TULARE WATER DISTRICT AND NON-PRODUCED WASTEWATER NEAR KERN-TULARE WATER DISTRICT**

On 4 April 2017, Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff collected fruit samples within the service territory of Kern-Tulare Water District. Samples were collected from two site types: (1) citrus trees irrigated with blended produced wastewater [treated sites] and (2) citrus trees irrigated with non-produced wastewater [control sites]. Citrus samples were shipped, via FedEx overnight delivery, to Weck Laboratories, Inc., for analysis.

### PRESENT PARTIES

#### Foreman / Manager from each property

#### Central Valley Regional Water Quality Control Board (Central Valley Water Board)

- W. Dale Harvey, Supervising Engineer
- Joshua Mahoney, Water Resource Control Engineer
- Mercedes Merino, Engineering-Geologist (Translator)

#### University of the Pacific (UOP)

- Ben Grafius, Graduate Assistant for Dr. Stringfellow (Science Advisor)

### GENERAL SAMPLING PROCEDURES

#### Equipment:

1. Nitrile gloves.
2. Kimwipes.
3. 32 ounce glass sample containers from laboratory.
4. Ice chests.

#### Fruit Handling:

1. Nitrile gloves were used while handling fruit.
2. Cut fruit from tree with trimmers.
3. Wipe the fruit.

4. Place the fruit in the sample container.
5. Seal the container and tape the lid.
6. Sample containers remain in the ice chest until delivered to the laboratory.

Fruit Selection Criteria:

1. Minimum distance from main road was five tree rows.
2. Minimum distance from access road was six trees.
3. Samples collected from the same tree were picked from different branches.
4. All samples were ripe.
5. No unfavorable features or colors.
6. The rind was not damaged or peeled prior to being received by Weck Laboratories, Inc.
7. Samples were representative of the fruit an average consumer would find at a store.

**SAMPLE ANALYSIS**

The Chain of Custody specifies the following analysis:

1. Volatile Organic Compounds - US EPA Method 8260B (Full Analysis)
2. Semi-Volatile Organic Compounds – US EPA Method 8270C-SIM (Full Analysis)
3. Metals – US EPA 6020A & 6020B (CAM-17)
4. Methanol – US EPA Method 8015D

**CONTROL SAMPLE SITES**

Site 1

Site Name: Control-1\_Navel-1  
Fruit Type: Navel  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 40 (from the west)  
Tree Count from the road: 10, 11, and 12

Sample Time for AEC: 08:15  
Sample Names:  
JGM170404-1 (Water Board sample)

Notes: Irrigated with water from Kern-Tulare Water District that does not contain blended produced wastewater.

Site 2

Site Name: Control-2\_Valencia-1  
Fruit Type: Valencia  
Fruits per Sample Container: 2

Sample Containers per Tree: 1  
Tree Row: 40 (from the west)  
Tree Count from the road: 10, 11, and 12

Sample Time: 08:25 and 08:30 (duplicate)  
Sample Names:  
JGM170404-2 (Water Board sample)  
JGM170404-3 (Water Board duplicate sample)

Notes: Irrigated with water from Kern-Tulare Water District that does not contain blended produced wastewater.

### Wastewater Sample Sites

#### Site 3

Site Name: Wastewater-3_Navel-1	Sample Containers per Tree: 1
Fruit Type: Navel	Tree Row: 31 (from the north)
Fruits per Sample Container: 2	Tree Count from the road: 9, 10, and 12

Sample Time: 10:30 and 10:50 (duplicate)

Sample Names:

JGM170404-4 (Water Board sample)

JGM170404-5 (Water Board duplicate sample)

Notes: Irrigated with blended produced wastewater from the Jasmin Ranchos Mutual Water Company Reservoir.

#### Site 4

Site Name: Wastewater-4_Valencia-2	Sample Containers per Tree: 1
Fruit Type: Valencia	Tree Row: 5 (from the south)
Fruits per Sample Container: 2	Tree Count from the road: 8, 9, and 10

Sample Time: 11:18 and 11:20 (duplicate)

Sample Names:

JGM170404-6 (Water Board sample)

JGM170404-7 (Water Board duplicate sample)

Notes: Irrigated with blended produced wastewater from the Jasmin Ranchos Mutual Water Company Reservoir.

In 2009, Central Valley Water Board staff observed a discharge of oil from irrigation lines at this location.

#### Site 5 – No Samples Collected

Site Name: Wastewater-5_Lemon-1	Sample Containers per Tree: NA
Fruit Type: Lemon	Tree Row: NA
Fruits per Sample Container: NA	Tree Count from the road: NA

Sample Time: 11:40

Sample Names:

NA

Notes: Irrigated with blended produced wastewater from the Jasmin Ranchos Mutual Water Company Reservoir.

Available sample locations were adjacent to roadways and did not satisfy the fruit selection criteria.

**SITE PHOTOS**

Navel Trees



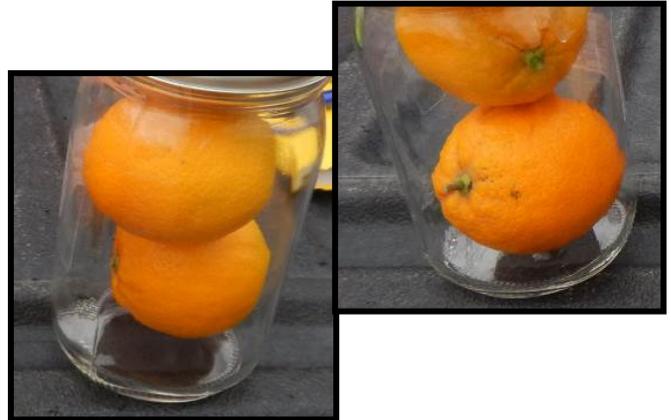
Valencia Trees



Collecting Samples



Citrus Fruit Samples



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## Central Valley Regional Water Quality Control Board

**TO:** Clay L. Rodgers  
Assistant Executive Officer

Dale W. Harvey  
Supervising Engineer

**FROM:** Joshua G. Mahoney  
Water Resource Control Engineer

Rebecca T. Asami  
Engineering Geologist

**SAMPLE DATE:** 20 July 2017

**SUBJECT: NOTES FOR COLLECTION OF FRUIT SAMPLES IRRIGATED WITH NON-PRODUCED WASTEWATER NEAR CAWELO WATER DISTRICT**

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff observed the collection of garlic samples by Advanced Environmental Concepts, Inc., a third-party consulting group collecting samples on behalf of Cawelo Water District. Central Valley Water Board staff (Staff) obtained ownership of all garlic samples throughout the sampling event. Garlic samples were shipped via FedEx to Weck Laboratories, Inc., for analysis. Samples were sent to laboratory through an air courier following Department of Transportation standards.

### PARTIES PRESENT

**Sample Team from Advanced Environmental Concepts, Inc. (AEC)**

- Project Manager and Field Staff
- Field Staff

**Representatives from Cawelo Water District (Cawelo)**

- Superintendent

**Central Valley Regional Water Quality Control Board (Central Valley Water Board)**

- Joshua Mahoney, Water Resource Control Engineer
- Rebecca T. Asami, Engineering-Geologist

### GENERAL SAMPLING PROCEDURES

Equipment:

1. Nitrile gloves
2. Mason jars (hereafter sample container)
3. Ice chest
4. Handheld shovel (rinsed with deionized water at each site)
5. Clippers (rinsed with deionized water at each site)

**Fruit Handling:**

1. Nitrile gloves were used at all times
2. Removed garlic with handheld shovel
3. Gently shook and wiped garlic to remove dirt
4. Trimmed roots and stalk
5. Sealed the garlic samples in a sample container and taped the lid
6. Sample containers remain in ice chest until delivered to the laboratory

**Fruit Selection Criteria:**

1. Minimum distance from main road was at least 100 feet
2. Minimum distance from access road was at least 100 feet
3. At each sample site, garlic was picked from three different locations within 10 feet of each other, preferably from adjacent rows
4. All samples appeared to be ripe
5. Garlic samples did not appear to have any unfavorable features or colors
6. Samples appeared to be representative of what an average consumer would find at a store

**SAMPLE ANALYSIS**

The Chain of Custody specifies the following analysis:

1. Volatile Organic Compounds - US EPA Method 8260B (Full Analysis)
2. Semi-Volatile Organic Compounds – US EPA Method 8270C-SIM (Full Analysis)
3. Metals – US EPA 6020A & 6020B (CAM-17)
4. Methanol – US EPA Method 8015D

**SAMPLE SITE NOTES**Site 1

Site Name: Gar01 - 01  
Fruit Type: Garlic

Approximate Row: 120 (from west)  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 0740 - 0810  
Sample Name(s): Gar01-20170718-0737  
Gar00-20170718-0800 (dup)

Notes: Soil was moist, recently irrigated.  
Field appeared to have had recently been worked; garlic leaves had been removed from plants in field.

Site 2

Site Name: Gar01 - 02  
Fruit Type: Garlic

Approximate Row: 200 (from west)  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 0830 - 0845

Sample Name(s): Gar01-2-20170718-0831

Notes: Sample was collected at the opposite end of the field from Gar01-01.  
Soil was dry. Garlic leaves had been removed from plants in field.

Site 3

Site Name: Gar03 - 01  
Fruit Type: Garlic

Approximate Row: 88 (from east)  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 0946 - 1010  
Sample Name(s): Gar03-20170718-0950

Notes: Soil was moist, recently irrigated.  
Field was recently worked on; garlic leaves had been removed from plants in field.

Site 4

Site Name: Gar03 - 02  
Fruit Type: Garlic

Approximate Row: 66 (from east)  
Approximate Distance into the Field: 500 ft.

Time at the Sample Site: 1015 - 1030  
Sample Name(s): Gar03-2-20170718-1019

Notes: Sample was collected at the opposite end of the field from Gar03-01.  
Soil was moist, recently irrigated.  
Field was recently worked on; garlic leaves had been removed from plants in field.

PHOTOGRAPHS

Photo 1 – Garlic rows at site Gar01-01.



Photo 2 – Removal of garlic.



Photo 3 – Partially excavated garlic.



Photo 4 – Excavated garlic.



Photo 5 – Trimming garlic samples.



Photo 6 – Garlic samples.



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## Central Valley Regional Water Quality Control Board

**TO:** Clay L. Rodgers  
Assistant Executive Officer

Dale W. Harvey  
Supervising Engineer

**FROM:** Rebecca T. Asami  
Engineering Geologist

**SAMPLE DATE:** 8 August 2017

**SUBJECT: COLLECTION OF ALMOND, GARLIC, AND GRAPE SAMPLES IRRIGATED WITH PRODUCED WASTEWATER WITHIN CAWELO WATER DISTRICT AND NONPRODUCED WATER NEAR CAWELO WATER DISTRICT**

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff observed the collection of garlic, grape, and almond samples by Advanced Environmental Concepts, Inc. (a third-party consulting group), collecting samples on behalf of Cawelo Water District. Central Valley Water Board staff obtained all samples before they were shipped via FedEx to Weck Laboratories, Inc., for analysis.

### **PARTIES PRESENT**

#### **Sample Team from Advanced Environmental Concepts, Inc. (AEC)**

- Field Staff and Project Manager
- Field Staff

#### **Representatives from Cawelo Water District (Cawelo)**

- Superintendent

#### **Central Valley Regional Water Quality Control Board (Central Valley Water Board)**

- Rebecca T. Asami, Engineering Geologist

### **GENERAL SAMPLING PROCEDURES**

#### Equipment:

1. Nitrile gloves
2. Wide mouth glass Mason jars (sample containers)
3. Ice chest
4. Clippers
5. Spade
6. Shovel

#### Almond Handling:

1. Nitrile gloves were used at all times
  - o No clippers were used to collect almond samples

2. Almonds, with the hulls, were hand-picked from the tree
3. The sample container was sealed and the lid was taped
4. Sample containers remained in ice chest until delivered to the laboratory

#### Garlic Handling:

1. Nitrile gloves were used at all times
2. Garlic samples removed from field with spade or large shovel
3. Garlic scape and roots were removed with clippers
4. The sample container was sealed and the lid was taped
5. Sample containers remained in ice chest until delivered to the laboratory

#### Grape Handling:

1. Nitrile gloves were used at all times
2. Grape vines were cut into small sections
3. The sample container was sealed and the lid was taped
4. Sample containers remained in ice chest until delivered to the laboratory

#### Sample Selection Criteria:

1. Minimum distance from main road was at least 100 feet
2. Minimum distance from access road was at least 100 feet
3. At each sample site, fruit was picked from three different locations within close proximity of each other. Generally, from adjacent rows in the same field.
4. Three crops were sampled (garlic, grapes, almonds)
5. Garlic selection:
  - a. Whole bulb intact after removal from soil
  - b. Chosen garlic sample totally submerged in soil before processing
  - c. No unfavorable moisture content in samples
  - d. Samples taken from adjacent rows or nearby rows
  - e. Samples were representative of what a consumer would purchase in store
6. Almond selection:
  - a. Shell did not appear to be rotten
  - b. Almonds were hanging on the tree
  - c. Samples either taken from trees on adjacent rows, or nearby rows depending on availability
7. Grape selection:
  - a. All samples were ripe
  - b. No unfavorable features or colors
  - c. Samples were representative of the fruit an average consumer would purchase
  - d. Samples taken from adjacent rows or nearby rows depending on availability

## **SAMPLE ANALYSIS**

All samples processed so that only edible portion analyzed, composite samples analyzed for the following:

1. Volatile Organic Compounds - US EPA Method 8260B (Full Analysis)
2. Semi-Volatile Organic Compounds – US EPA Method 8270C-SIM (Full Analysis)
3. Metals – US EPA 6020A & 6020B (CAM-17)
4. Methanol – US EPA Method 8015D

**SAMPLE SITE NOTES**Site 1

Site Name: Gar02 – 01 (sunny, clear)  
Fruit Type: Garlic

Approximate Row: 12 (from north)  
Approximate Distance into the Field: 110 ft.

Time at the Sample Site: 0638 – 0705  
Sample Name(s): Gar02-20170808-0645  
Gar00-20170808-0645 (dup)

Notes: Some of the garlic in field had dry stems and leaves. Garlic samples were dug out of ground using a spade. Soil of the field was dry. Workers were present in the field during sampling but not near sampling team. Samples that did not maintain bulb structure were discarded. Samples were comprised of whole bulbs. Samples taken from adjacent rows in the same approximate area of field. Field appeared to be in the process of being harvested.

Site 2

Site Name: Gar02 – 02 (sunny, clear)  
Fruit Type: Garlic

Approximate Row: 90 (from south)  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 0726 - 0745  
Sample Name(s): Gar02-20170808-0725

Notes: Garlic samples from same field as sample Gar02-20170808-0645 but distinctly different portion of the field. Soil was dry. Workers were in the field. Only whole bulbs were used as samples. Samples taken from same approximate area and from adjacent rows. Field appeared to be in the process of being harvested.

Site 3

Site Name: Grp 20 (sunny, clear)  
Fruit Type: Grape

Approximate Row: 25  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 0731- 0840  
Sample Name(s): Grp20-20170808-0830  
Grp00-20170808-0835 (dup)

Notes: Grapes picked using clippers, otherwise unaltered. Samples were ripe, appeared ready for harvest. Whole bunches placed in sample jars, including small portions of stems. Ground soil was moist.

Site 4

Site Name: Grp 19 (sunny, clear)  
Fruit Type: Grape

Approximate Row: 75  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 0845-0900  
Sample Name(s): Grp19-20170808-0857

Notes: Grapes picked using clippers, otherwise unaltered. Samples were ripe, appeared ready for harvest. Whole bunches placed in sample jars, including small portions of stems. Ground was moist.

Site 5

Site Name: Alm20 (sunny, clear)  
Fruit Type: Almond

Approximate Row: 24  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 0945-1000  
Sample Name(s): Alm20-20170808-0950  
Alm00-20170808-0955 (dup)

Notes: Almonds picked by hand, otherwise unaltered. Samples with hull that was dry, and split. Samples appeared ready for harvest. Several rows sampled, typically adjacent rows. Trees from the same approximate area. No samples taken from the ground or any other source. Ground was dry.

Site 6

Site Name: Alm19 (sunny, clear)  
Fruit Type: Almond

Approximate Row: 22  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 1005-1013  
Sample Name(s): Alm19-20170808-1012

Notes: Almonds picked by hand, otherwise unaltered. Samples chosen with a dry, split hull. Samples appeared ready for harvest. Several rows sampled, typically adjacent rows. Trees sampled from the same approximate area. No samples taken from the ground or any other source. Ground was dry.

Site 7

Site Name: Alm10 (sunny, clear)  
Fruit Type: Almond

Approximate Row: 25  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 1040-1055  
Sample Name(s): Alm10-20170808-1040  
Alm21-20170808-1045 (dup)

Notes: Almonds picked by hand, otherwise unaltered. Samples chosen had a hull that was dry and split. Samples appeared ready for harvest. Several adjacent rows sampled. Trees that were sampled were in the same approximate area. No samples taken from the ground or any other source. Ground was moist.

Site 8

Site Name: Alm09 (sunny, clear)  
Fruit Type: Almond

Approximate Row: 23  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 1110-1120  
Sample Name(s): Alm09-20170808-1115

Notes: Almonds picked by hand, otherwise unaltered. Samples chosen had a hull that was dry and split. Samples appeared ready for harvest. Several rows sampled. Trees sampled in proximity to each other, but not adjacent as there were not enough nuts on each tree. No samples taken from the ground or any other source. Trees were watered while sampling occurred. Ground was moist, appeared to have been recently watered.

Site 9

Site Name: Grp09 (sunny, clear, warm)  
Fruit Type: Grape

Approximate Row: 30  
Approximate Distance into the Field: 100ft

Time at the Sample Site: 1148-1157  
Sample Name(s): Grp09-20170808-1150  
Grp21-20170808-1155 (dup)

Notes: Samples cut from branches using clippers. Samples were ripe, and appeared ready for harvest. Whole bunches placed in sample jars, including small portions of stems. Field watered during sampling via drip line.

Site 10

Site Name: Grp08 (sunny, clear, hot)  
Fruit Type: Grape

Approximate Row: 23  
Approximate Distance into the Field: 100ft

Time at the Sample Site: 1213-1218  
Sample Name(s): Grp08-20170808-1218

Notes: Samples cut from branches using clippers. Samples were ripe, appeared ready for harvest. Whole bunches placed in sample jars, including small portions of stems. Field watered during sampling via drip line.

Site 11

Site Name: Alm08 (sunny, clear, hot)  
Fruit Type: Almond

Approximate Row: 19  
Approximate Distance into the Field: 100ft



PHOTOGRAPHS



Photograph 1. –Gar-02 sample location. Garlic roots cut from bulb.



Photograph 2. – Gar-02 sample location. Bulbs unearthed and then trimmed before placed in jars.



Photograph 3. – Garlic samples put in jars and put on ice in cooler.



Photograph 4. – Gar-02 sample location.



Photograph 5. – Garlic samples unearthed with spade.



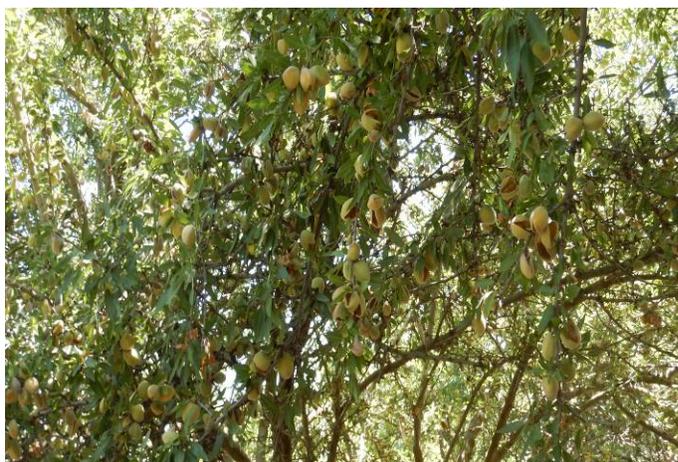
Photograph 6. – Garlic samples in jars.



Photograph 7. – Alm07 sample locality. Orchard has recently been watered.



Photograph 8. – Alm09 sample locality. Almond hulls have been split.



Photograph 9. – Alm09 sample locality. Almonds with hulls split.



Photograph 10. – Alm08 sample locality. Almond orchards.



Photograph 11. – Almond samples in jars.



Photograph 12. – Alm20 sample locality. Almonds picked by hand.



Photograph 13. – Grp20 sample locality. Samples cut from vine with clippers.



Photograph 14. – Grp20 sample locality. Grape sample jars. Samples packed in coolers on ice.



Photograph 15. – Grp08 sample locality. Grapes appear ready for harvest.



Photograph 16. – Grp08 sample locality. Grape samples in jars.



Photograph 17. – Grp19 sample locality. Samples clipped from vine and put in jars.



Photograph 18. – Grp19 sample locality. Grape vines in field.

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## Central Valley Regional Water Quality Control Board

**TO:** Clay L. Rodgers  
Assistant Executive Officer

Dale W. Harvey  
Supervising Engineer

**FROM:** Josh Mahoney  
Water Resources Control Engineer

Omar Erekat  
Water Resources Control Engineer

**DATE:** 9 August 2017

**SUBJECT: NOTES FOR COLLECTION OF ALMOND AND GRAPE SAMPLES IRRIGATED WITH  
NON-PRODUCED WASTEWATER NEAR CAWELO WATER DISTRICT**

On 9 August 2017, Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff observed the collection of fruit samples by Advanced Environmental Concepts, Inc., a third party consulting group collecting samples on behalf of Cawelo Water District. Central Valley Water Board staff (Staff) obtained ownership of all fruit samples throughout the sampling event. Samples were shipped, via FedEx overnight delivery, to Weck Laboratories, Inc., for analysis.

### **PARTIES PRESENT**

**Project Manager and Field Staff from Advanced Environmental Concepts, Inc. (AEC)**

**District Manager and Superintendent from Cawelo Water District (Cawelo)**

**Central Valley Regional Water Quality Control Board (Central Valley Water Board)**

- Joshua Mahoney, Water Resource Control Engineer
- Omar Erekat, Water Resource Control Engineer

### **GENERAL SAMPLING PROCEDURES**

Equipment:

1. Nitrile gloves.
2. Mason jars (hereafter sample container).
3. Ice chest.
4. Clippers (rinsed with deionized water at each site).

Almond Handling:

1. Nitrile gloves were used at all times.
2. Almonds pulled from trees.
3. Almonds were placed in sample containers.

4. Sample containers were sealed and taped closed.
5. Sample containers remain in ice chest until delivered to the laboratory.

Grape Handling:

1. Nitrile gloves were used at all times.
2. Grape clusters were cut into smaller clusters that would fit in sample container.
3. Grapes were placed in sample containers.
4. Sample containers were sealed and taped closed.
5. Sample containers remain in ice chest until delivered to the laboratory.

Fruit Selection Criteria:

1. Minimum distance from main road was at least 100 feet.
2. Minimum distance from access road was at least 100 feet.
3. At each sample site, fruit was picked from three different location within close proximity of each other.
4. Almond selection:
  - a. Outer shell was split.
  - b. Shell did not appear to be rotten.
  - c. Fruit was on the tree, samples were not pulled from the ground.
5. Grape selection:
  - a. All samples appeared to be ripe.
  - b. No unfavorable features or colors.
  - c. Samples were representative of the fruit an average consumer would find at a store.

## **SAMPLE ANALYSIS**

The Chain of Custody specifies the following analysis:

1. Volatile Organic Compounds - US EPA Method 8260B (Full Analysis)
2. Semi-Volatile Organic Compounds – US EPA Method 8270C-SIM (Full Analysis)
3. Metals – US EPA 6020A & 6020B (CAM-17)
4. Methanol – US EPA Method 8015D

## **SAMPLE SITES**

### Site 1

Site Name: Almond18  
Fruit Type: Almond

Approximate Row: 13, 15, 17 (from east)  
Approximate Distance into the Field: 8, 9, 8

Time at the Sample Site: 0700 - 0718  
Sample Name(s): ALM18-20170809-0702

Notes: Almonds observed on the ground.  
Farm equipment drove through the field that morning.  
Trees appeared to be full of fruit.  
Irrigated with freshwater (control site).

Site 2

Site Name: Grape16  
Fruit Type: Grape

Approximate Row: 24, 25, 26 (from east)  
Approximate Distance into the Field: 13, 13, 13

Time at the Sample Site: 0726 - 0744  
Sample Name(s): GRP16-20170809-0726  
GRP00-2017-0809-0728

Notes: Cotton Candy Grapes  
Actively irrigating via drip irrigation.  
Vines appeared to be full of fruit.  
Irrigated with freshwater (control site).

Site 3

Site Name: Grape15  
Fruit Type: Grape

Approximate Row: 24, 25, 26 (from west)  
Approximate Distance into the Field: 13, 13, 13

Time at the Sample Site: 0747 - 0801  
Sample Name(s): GRP15-20170809-0748

Notes: Cotton Candy Grapes  
Drip irrigation.  
Vines appeared to be full of fruit.  
Irrigated with freshwater (control site).

Site 4

Site Name: Grape18  
Fruit Type: Grape

Approximate Row: 24, 25, 26 (from west)  
Approximate Distance into the Field: 14, 14, 14

Time at the Sample Site: 0808 - 0821  
Sample Name(s): GRP18-20170809-0809

Notes: Sweet Safflower Grapes.  
Drip irrigation.  
Vines appeared to be full of fruit.  
Irrigated with freshwater (control site).

Site 5

Site Name: Grape17  
Fruit Type: Grape

Approximate Row: 16, 17, 18 (from west)  
Approximate Distance into the Field: 13, 13, 13

Time at the Sample Site: 0823 - 0838  
Sample Name(s): GRP17-20170809-0825

Notes: Cotton Candy Grapes.  
Active irrigation via drip irrigation.

Vines appeared to be full of fruit.  
Irrigation fluid appears to contain white nutrient mix. Irrigation water is cloudy.  
Irrigated with freshwater (control site).

#### Site 6

Site Name: Almond16  
Fruit Type: Almond

Approximate Row: 25, 26, 27 (from west)  
Approximate Distance into the Field: 7, 7, 9

Time at the Sample Site: 0840 - 0901  
Sample Name(s): ALM16-20170809-0845  
ALM00-20170809-0840

Notes: Irrigation via sprinklers.  
Tree appeared to contain numerous ripe fruit.  
Half the fruit appeared to have split shells and were candidates for samples.  
Irrigated with freshwater (control site).

#### Site 7

Site Name: Almond17  
Fruit Type: Almond

Approximate Row: 25, 23, 21 (from east)  
Approximate Distance into the Field: 7, 7, 7

Time at the Sample Site: 0907 - 0921  
Sample Name(s): ALM17-20170809-0908

Notes: Irrigation via sprinklers.  
Tree appeared to contain numerous ripe fruit.  
Half the fruit appeared to have split shells and were candidates for samples.  
Irrigated with freshwater (control site).

#### Site 8

Site Name: Almond15  
Fruit Type: Almond

Approximate Row: 24, 22, 20 (from east)  
Approximate Distance into the Field: 7, 7, 8

Time at the Sample Site: 0928 - 0943  
Sample Name(s): ALM15-20170809-0930

Notes: Drip irrigation.  
Half the fruit appeared to have split shells and were candidates for samples.  
Irrigated with freshwater (control site).

#### Site 9

Site Name: Grape14  
Fruit Type: Grape

Approximate Row: 30, 31, 32 (from south)  
Approximate Distance into the Field: 14, 14, 14

Time at the Sample Site: 0950 - 1008  
Sample Name(s): GRP14-20170809-0952

Notes: Pinot Grigio Grapes.  
Drip irrigation.  
Majority of grapes appeared to be ripe.  
Irrigated with freshwater (control site).

#### Site 10

Site Name: Almond14  
Fruit Type: Almond

Approximate Row: 24, 26, 28 (from south)  
Approximate Distance into the Field: 8, 8, 8

Time at the Sample Site: 1103 - 1124  
Sample Name(s): ALM14-20170809-1105

Notes: Almonds were recently knocked down.  
Drip irrigation.  
Limited selection of fruit available on the trees.  
Irrigated with freshwater (control site).

#### Site 11

Site Name: Almond12  
Fruit Type: Almond

Approximate Row: 22, 23, 24 (from east)  
Approximate Distance into the Field: 8, 8, 8

Time at the Sample Site: 1134 - 1152  
Sample Name(s): ALM12-20170809-1133

Notes: Almonds had not been knocked down yet, trees were full.  
Majority of fruit appeared to be ripe.  
Drip irrigation.  
Irrigated with freshwater (control site).

#### Site 12

Site Name: Almond11  
Fruit Type: Almond

Approximate Row: 23, 24, 25 (from east)  
Approximate Distance into the Field: 7, 8, 7

Time at the Sample Site: 1156 - 1211  
Sample Name(s): ALM11-20170809-1200

Notes: Almonds had not been knocked down yet, trees were full.  
Drip irrigation.  
Irrigated with freshwater (control site).

#### Site 13

Site Name: Almond13  
Fruit Type: Almond

Approximate Row: 25, 26, 29 (from west)  
Approximate Distance into the Field: 7, 7, 8

Time at the Sample Site: 1220 - 1238  
Sample Name(s): ALM13-20170809-1220

Notes: Trees were shaken that day, limited selection.  
Approximately 50 feet north is a section of trees that were dead  
Drip irrigation.  
Irrigated with freshwater (control site).

Site 14

Site Name: Grape12  
Fruit Type: Grape

Approximate Row: 18, 19, 20 (from west)  
Approximate Distance into the Field: 13, 13, 13

Time at the Sample Site: 1348 - 1405  
Sample Name(s): GRP12-20170809-1353

Notes: Flame Seedless Grapes  
Within a mile of the highway.  
Drip irrigation.  
Irrigated with freshwater (control site).

Site 15

Site Name: Grape13  
Fruit Type: Grape

Approximate Row: 26, 27, 28 (from west)  
Approximate Distance into the Field: 13, 13, 13

Time at the Sample Site: 1408 - 1423  
Sample Name(s): GRP13-20170809-1410

Notes: Flame Seedless Grapes  
Within a mile of the highway.  
Drip irrigation.  
Irrigated with freshwater (control site).

Site 16

Site Name: Grape11  
Fruit Type: Grape

Approximate Row: 23, 24, 25 (from west)  
Approximate Distance into the Field: 13, 13, 13

Time at the Sample Site: 1442 - 1508  
Sample Name(s): GRP11-20170809-1443

Notes: Musket Grapes.  
Drip irrigation.  
Irrigated with freshwater (control site).

**SITE PHOTOS**

Photo 1 – Almond trees at Almond 18.



Photo 2 – Almonds on the tree at Almond 18.



Photo 3 – Photo of almond sample at Almond 15.



Photo 4 – Photo of picking almonds at Almond 11.



Photo 5 – Photo of filling the sample container.



Photo 6 – Photo of a sealed sample container.



**SITE PHOTOS**

Photo 7 – Photo of canopy grape vines at Grape 16. Photo 8 – Photo of non-canopy grape vines at Grape 14.



Photo 9 – Photo of grape sample at Grape 15.

Photo 10 – Photo of picking grapes at Grape 14.



Photo 11 – Photo of filling the sample container.

Photo 12 – Photo of a sealed sample container.



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## Central Valley Regional Water Quality Control Board

**TO:** Clay L. Rodgers  
Assistant Executive Officer

Dale W. Harvey  
Supervising Engineer

**FROM:** Omar Erekat  
Water Resources Control Engineer

**SAMPLE DATE:** 10 August 2017

**SUBJECT: NOTES FOR THE COLLECTION OF GRAPE AND ALMOND SAMPLES  
IRRIGATED WITH BELNDED PRODUCED WASTEWATER IN CAWELO WATER  
DISTRICT**

On 10 August 2017, Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff observed the collection of fruit samples by Advanced Environmental Concepts, Inc., a third party consulting group collecting samples on behalf of Cawelo Water District. Central Valley Water Board staff (Staff) obtained ownership of all samples throughout the sampling event. Fruit samples were shipped, via FedEx overnight delivery to Weck Laboratories, Inc. (Weck), for analysis.

### PARTIES PRESENT

#### **Sampling Team from Advanced Environmental Concepts, Inc. (AEC)**

- Project Manager and Field Staff Member
- Field Staff

#### **Representatives from Cawelo Water District (Cawelo)**

- Superintendent

#### **Central Valley Regional Water Quality Control Board (Central Valley Water Board)**

- Omar Erekat, Water Resource Control Engineer

### GENERAL SAMPLING PROCEDURES

#### Equipment:

1. Nitrile gloves.
2. Mason jars (hereafter sample container).
3. Ice chest.
4. Clippers (rinsed with deionized water at each site).

#### Almond Handling:

1. Nitrile gloves were used at all times.
2. Almonds, with the shells, were pulled from the tree.
3. Sealed the sample container and tape the lid.
4. Sample containers remained in ice chest until delivered to the laboratory.

Grape Handling:

1. Nitrile gloves were used at all times.
2. Grape vines were cut into small sections.
3. Sealed the sample container and tape the lid.
4. Sample containers remained in ice chest until delivered to the laboratory.

Fruit Selection Criteria:

1. Minimum distance from main road was at least 100 feet.
2. Minimum distance from access road was at least 100 feet. Except for Site Alm04 – 01; where fruits were collected from a location approximately 85-feet from access road, due to the limited availability of ripe split fruits.
3. At each sample site, fruit was picked from three different locations within close proximity of each other.
4. Almond selection:
  - a. Outer shell had split.
  - b. Shell did not appear to be rotten.
  - c. Fruit was hanging on the tree.
5. Grape selection:
  - a. All samples were ripe.
  - b. No unfavorable features or colors.
  - c. Samples were representative of the fruit an average consumer would find at a store.

## **SAMPLE ANALYSIS**

The Chain of Custody specifies the following analysis:

1. Volatile Organic Compounds - US EPA Method 8260B (Full Analysis)
2. Semi-Volatile Organic Compounds – US EPA Method 8270C-SIM (Full Analysis)
3. Metals – US EPA 6020A & 6020B (CAM-17)
4. Methanol – US EPA Method 8015D

## **SAMPLE SITES**

### Site 1

Site Name: Alm05 - 01  
Fruit Type: Almond

Approximate Location: Row 19 (tree 7),  
Row 20 (tree 8), and Row 21 (tree 7) (rows  
are from south and trees are from west)  
Approximate Distance Into the Field: 120 ft.

Time at the Sample Site: 0640 - 0706  
Sample Name(s): Alm05-20170810-0645  
Alm21-20170810-0648 (dup)

Notes: Trees were full of fruits, drip irrigation was turned off, and the sound of farming equipment could be heard. Irrigated with blended produced wastewater (treated site).

Site 2

Site Name: Grp06 - 01  
Fruit Type: Grapes

Approximate Location: Row 25 (vine 13),  
Row 26 (vine 13), and Row 27 (vine 13)  
(rows are from south and vines are from  
west)  
Approximate Distance Into the Field: 100 ft.

Time at the Sample Site: 0712 - 0728  
Sample Name(s): Grp06-20170810-0715  
Grp21-20170810-0720 (dup)

Notes: Fruit variety is Autumn King, vines were full of fruits, and drip irrigation was on.  
Irrigated with blended produced wastewater (treated site).

Site 3

Site Name: Alm04 - 01  
Fruit Type: Almond

Approximate Location: Row 72 (tree 6),  
Row 73 (tree 9), and Row 74 (tree 11) (rows  
are from east and trees are from north)  
Approximate Distance into the Field: 85 ft.

Time at the Sample Site: 0742 - 0806  
Sample Name(s): Alm04-20170810-0745

Notes: Trees were full of fruits (mostly not split yet), irrigation was turned off, no sound of  
farming equipment could be heard.  
Irrigated with blended produced wastewater (treated site).

Site 4

Site Name: Alm03 - 01  
Fruit Type: Almond

Approximate Location: Row 23 (tree 9),  
Row 24 (tree 9), and Row 27 (tree 9) (rows  
are from east and trees are from north)  
Approximate Distance Into the Field: 175 ft.

Time at the Sample Site: 0816 - 0834  
Sample Name(s): Alm03-20170810-0822

Notes: Trees were full of fruits (mostly not split yet), irrigation was turned on, and no sound of  
farming equipment could be heard.  
Irrigated with blended produced wastewater (treated site).

Site 5

Site Name: Alm02 - 01  
Fruit Type: Almond

Approximate Location: Row 20 (tree 9),  
Row 23 (tree 9), and Row 24 (tree 7) (rows  
are from west and trees are from north)  
Approximate Distance Into the Field: 140 ft.

Time at the Sample Site: 0841 - 0901  
Sample Name(s): Alm02-20170810-0845

Notes: Trees were full of ripe split fruits and irrigation was turned on.  
Irrigated with blended produced wastewater (treated site).

#### Site 6

Site Name: Alm01 - 01  
Fruit Type: Almond

Approximate Location: Row 25 (tree 6),  
Row 27 (tree 7), and Row 29 (tree 7) (rows  
are from east and trees are from north)  
Approximate Distance Into the Field: 130 ft.

Time at the Sample Site: 0910 - 0927  
Sample Name(s): Alm01-20170810-0915

Notes: Trees at some rows were full of fruits, some rows appeared to have been recently  
shaken, and shaking activity was taking place approximately 11 rows over.  
Irrigated with blended produced wastewater (treated site).

#### Site 7

Site Name: Grp05 - 01  
Fruit Type: Grapes

Approximate Location: Row 24 (vine 14),  
Row 25 (vine 14), and Row 26 (vine 14)  
(rows are from south and vines are from  
west)  
Approximate Distance Into the Field: 100 ft.

Time at the Sample Site: 0934 - 0946  
Sample Name(s): Grp05-20170810-0937

Notes: Fruit variety is Autumn King, vines were full of fruits, no farming equipment sound could  
be heard, and drip irrigation was on.  
Irrigated with blended produced wastewater (treated site).

#### Site 8

Site Name: Grp04 - 01  
Fruit Type: Grapes

Approximate Location: Row 25 (vine 16),  
Row 26 (vine 16), and Row 27 (vine 16)  
(rows are from north and vines are from  
west)  
Approximate Distance Into the Field: 100 ft.

Time at the Sample Site: 0953 - 1009  
Sample Name(s): Grp04-20170810-0957

Notes: Fruit variety is Timson, vines were full of fruits, no farming equipment sound could be  
heard, irrigation was off, and a number of rotten fruit punches were observed on some  
vines (not sampled).  
Irrigated with blended produced wastewater (treated site).

Site 9

Site Name: Grp03 - 01  
Fruit Type: Grapes

Approximate Location: Row 22 (vine 16),  
Row 23 (vine 16), and Row 24 (vine 16)  
(rows are from north and vines are from  
west)  
Approximate Distance Into the Field: 100 ft.

Time at the Sample Site: 1018 - 1038  
Sample Name(s): Grp03-20170810-1022

Notes: Fruit variety is Globe, vines were full of fruits, irrigation was off, and excessive weed  
growth among vines was observed.  
Irrigated with blended produced wastewater (treated site).

Site 10

Site Name: Grp10 - 01  
Fruit Type: Grapes

Approximate Location: Row 25 (vine 13),  
Row 26 (vine 13), and Row 27 (vine 13)  
(rows are from south and vines are from  
east)  
Approximate Distance Into the Field: 100 ft.

Time at the Sample Site: 1043 - 1056  
Sample Name(s): Grp10-20170810-1047

Notes: Fruit variety is Autumn King, vines were full of fruits, and irrigation was on.  
Irrigated with blended produced wastewater (treated site)

Site 11

Site Name: Grp02 - 01  
Fruit Type: Grapes

Approximate Location: Row 25 (vine 14),  
Row 26 (vine 14), and Row 27 (vine 14)  
(rows are from south and vines are from  
east)  
Approximate Distance Into the Field: 100 ft.

Time at the Sample Site: 1103 - 1117  
Sample Name(s): Grp02-20170810-1107

Notes: Fruit variety is Scarlett Royals, vines were full of fruits, irrigation was off, and sampling  
location was approximately 1500 ft. from a major highway.  
Irrigated with blended produced wastewater (treated site).

Site 12

Site Name: Grp01 - 01  
Fruit Type: Grapes

Approximate Location: Row 25 (vine 13),  
Row 26 (vine 13), and Row 27 (vine 13)

(rows are from north and vines are from  
west)

Approximate Distance Into the Field: 100 ft.

Time at the Sample Site: 1124 - 1145

Sample Name(s): Grp01-20170810-1129

Notes: Fruit variety is unknown, vines were full of fruits, irrigation was on, and sampling  
location was approximately 2000 ft. from a major highway.  
Irrigated with blended produced wastewater (treated site).

**PISTACHIO SITE PHOTOS**

Photo 1 – Location view at site Alm05-01.



Photo 2 – Ripe split fruits.



Photo 3 – One of the sampled trees.



Photo 4 – Sampled fruits in sealed jar.



Photo 5 – sealed and labeled sample jar.



Photo 6 – Duplicate sample.



**GRAPE SITE PHOTOS**

Photo 1 – Location view at site Grp06-01.



Photo 2 – Ripe fruits.

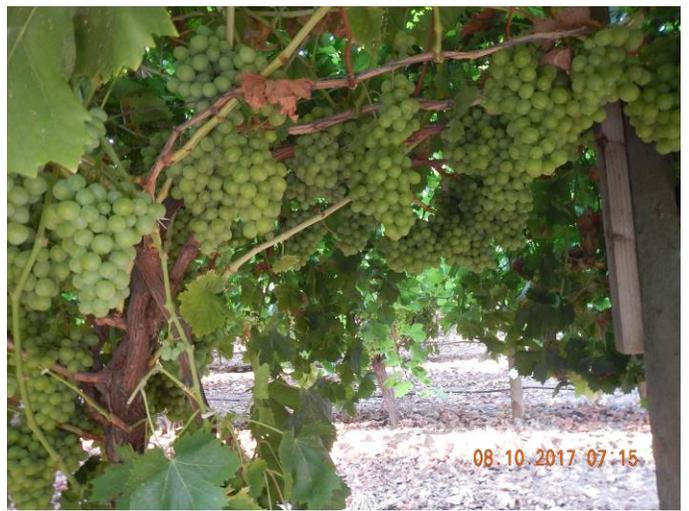


Photo 3 – One of the sampled vines.



Photo 4 – Sampled fruits in jars.



Photo 5 – sealed and labeled fruits.



Photo 6 – Duplicate sample.



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## Central Valley Regional Water Quality Control Board

**TO:** Clay L. Rodgers  
Assistant Executive Officer

Dale W. Harvey  
Supervising Engineer

**FROM:** Joshua G. Mahoney  
Water Resource Control Engineer

Rebecca T. Asami  
Engineering Geologist

**SAMPLE DATE:** 6 September 2017

**SUBJECT: NOTES FOR COLLECTION OF PISTACHIO SAMPLES IRRIGATED WITH PRODUCED WASTEWATER WITHIN CAWELO WATER DISTRICT AND NON PRODUCED WASTEWATER NEAR CAWELO WATER DISTRICT**

On 6 September 2017, Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff observed the collection of fruit samples by Advanced Environmental Concepts, Inc., a third party consulting group collecting samples on behalf of Cawelo Water District. Central Valley Water Board staff (Staff) obtained ownership of all samples during the sampling event. Fruit samples were shipped via FedEx overnight courier to Weck Laboratories, Inc. (Weck), for analysis.

### PARTIES PRESENT

**Sample Team from Advanced Environmental Concepts, Inc. (AEC)**

- Project Manager and Field Staff
- Field Staff

**Representatives from Cawelo Water District (Cawelo)**

- Superintendent

**Central Valley Regional Water Quality Control Board (Central Valley Water Board)**

- Joshua Mahoney, Water Resource Control Engineer
- Rebecca T. Asami, Engineering-Geologist

**University of the Pacific, Stockton**

- Ben Grafius, Graduate Assistant with Dr. Stringfellow (Science Advisor)

### GENERAL SAMPLING PROCEDURES

Equipment:

1. Nitrile gloves
2. Mason jars (hereafter sample container)
3. Ice chest

**Sampling Handling:**

1. Nitrile gloves were used at all times
2. Pistachios picked by hand and placed directly into glass mason jars
3. Whole nuts were picked directly from the tree in a manner that ensured that the samples would not be altered in any way
4. Nuts were not shelled or altered in any way
5. Sample containers were sealed and lids taped
6. Sample containers remained in ice chest until delivered to laboratory

**Sample Selection Criteria:**

1. Minimum distance from main road was at least 100 feet
2. Minimum distance from access road was at least 100 feet
3. At each sample site, pistachios were picked from three different nearby locations, from adjacent trees when possible
4. All samples appeared to be ripe, ready for harvest
5. Samples did not appear to have any unfavorable features or colors
6. Samples appeared to be representative of what an average consumer would find at a store

**SAMPLE ANALYSIS**

The Chain of Custody specifies the following analysis:

1. Volatile Organic Compounds - US EPA Method 8260B (Full Analysis)
2. Semi-Volatile Organic Compounds – US EPA Method 8270C-SIM (Full Analysis)
3. Metals – US EPA 6020A & 6020B (CAM-17)
4. Methanol – US EPA Method 8015D

**SAMPLE SITE NOTES**Site 1

Site Name: Pis02

Approximate Row: 24-27

Fruit Type: Pistachio (warm, dry, clear)

Approximate Distance into the Field: 130 ft.

Time at the Sample Site: 0740 - 0810

Sample Name(s): Pis02-20170906-0637

Pis21-20170906-0645 (dup)

Notes: Duplicate samples taken. Ground in field dry. Sampling began on the 9<sup>th</sup> tree into the field, greater than 100 feet into the field. Whole nuts with shell taken as samples.

Site 2

Site Name: Pis03

Approximate Row: 24-26

Fruit Type: Pistachio (warm, dry, clear)

Approximate Distance into the Field: 120 ft.

Time at the Sample Site: 0708-0732

Sample Name(s): Pis03- 20170906-0715

Notes: Pistachios had been recently watered via drip irrigation but most of the ground was dry. Sampling began at approximately the tenth tree, greater than 100 feet into the field.

### Site 3

Site Name: Pis06  
Fruit Type: Pistachio (warm, dry, clear)

Approximate Row: 24-26  
Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 0742-0750  
Sample Name(s): Pis06-20170906-0747

Notes: Sampling began on the 11<sup>th</sup> tree. Some of the nuts were over ripe and could not be collected as a part of the sample set. Only samples taken that appeared representative of what would be purchased in the store. Ground in field mostly dry but field had been recently watered.

### Site 4

Site Name: Pis07  
Fruit Type: Pistachio (warm, dry, clear)

Approximate Row: 22-24  
Approximate Distance into the Field: 160 ft.

Time at the Sample Site: 0817-0840  
Sample Name(s): Pis07-20170906-0825

Notes: Ground was moist and had been recently watered but most of the ground in field was dry. Sample collection began at approximately the 10<sup>th</sup> tree, greater than 100 feet into the field. Field had not been harvested yet.

### Site 5

Site Name: Pis11  
Fruit Type: Pistachio (warm, dry, clear)

Approximate Row: 22-25  
Approximate Distance into the Field: 110 ft.

Time at the Sample Site: 0852-0923  
Sample Name(s): Pis11-20170906-0858  
Pis00-20170906-0905 (dup)

Notes: Ground was moist, had been recently watered. Sample collection began at approximately the 10<sup>th</sup> tree. Trees were watered during the sampling event. Ground in the field was moist. Nuts were sparse. Field appeared to have already been harvested.

### Site 6

Site Name: Pis20  
Fruit Type: Pistachio (warm, dry, clear)

Approximate Row: 24-26  
Approximate Distance into the Field: 120 ft.

Time at the Sample Site: 1007-1029  
Sample Name(s): Pis20-20170906-1013

Notes: Ground was moist in some areas. Sampling started at approximately the 9<sup>th</sup> tree into the field. Greater than 100 feet into the field. Field had been recently watered but most of the ground in the field was dry. Trees had not yet been harvested.

### Site 7

Site Name: Pis18

Approximate Row: 23-25

Fruit Type: Pistachio (warm, dry, clear)

Approximate Distance into the Field: 118 ft.

Time at the Sample Site: 1105-1125

Sample Name(s): pis18-20170906-1107

Notes: Sampling began at approximately the 9<sup>th</sup> tree into the field. Greater than 100 feet into the field. Ground in field was dry. Adjacent trees sampled. Field had not yet been harvested.

### Site 8

Site Name: Pis19

Approximate Row: 23-25

Fruit Type: Pistachio (warm, dry, clear)

Approximate Distance into the Field: 100 ft.

Time at the Sample Site: 1135-1153

Sample Name(s): Pis-20170906-1139

Notes: Sunny, warm, dry weather. Nearby corn being harvested during sampling event. Sampling began at approximately eighth tree into the field. Ground was mostly dry, some puddling in the field. Sampling site near a dairy. CO<sub>2</sub> canisters were being used nearby the sample site.

### Site 9

Site Name: Pis13

Approximate Row: 24-26

Fruit Type: Pistachio (warm, dry, clear)

Approximate Distance into the Field: 180 ft.

Time at the Sample Site: 1237-1306

Sample Name(s): Pis13-20170906-1240

Notes: Samples taken at approximately the 12<sup>th</sup> tree into the field. Some of the tree rows had been watered during the sampling event via drip lines. Ground in the field was moist in some areas. CO<sub>2</sub> canisters were being used nearby the sample site. trees had not yet been harvested.

Site 10

Site Name: Pis12

Fruit Type: Pistachio (warm, dry, clear)

Approximate Row: 25-26

Approximate Distance into the Field: 130 ft.

Time at the Sample Site: 1313-1340

Sample Name(s): pis-20170906-1319

Notes: Ground moist, field had been recently watered. Sampling began at approximately the tenth tree into the field, more than 100 feet into the field. Ground in the field was dry. Field had not yet been harvested.

PHOTOGRAPHS



Photo 1. Pis02 location. Samples handpicked.



Photo 4. Pis03 location.



Photo 2. Pis02 location. Pistachios on the tree

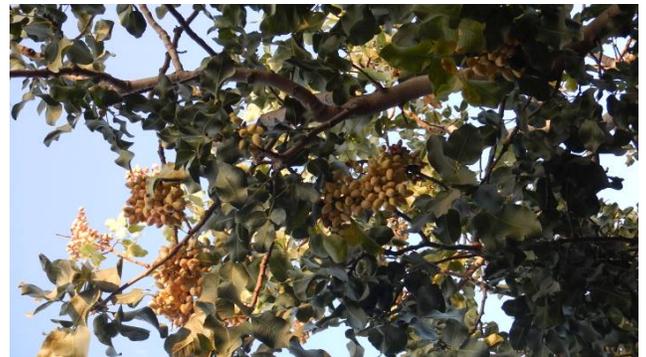


Photo 5. Pis03 location. Pistachios on the tree.



Photo 3. Pis07 location. Ripe pistachios on the tree.



Photo 6. Pis07 location. Edge of the sampled field.



Photo 7. Pis11 location.

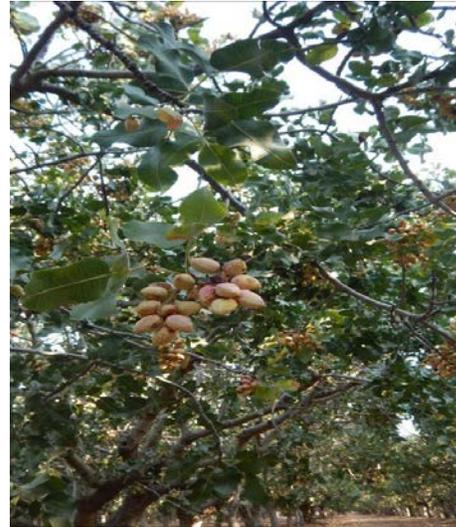


Photo 10. Pis07 location. Ripe pistachios on the tree.



Photo 8. Pis13 location. Note drip lines. Some of the field had been recently irrigated.



Photo 11. Pis13 location. Samples picked by hand.



Photo 9. Samples shipped with ice in coolers.

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## Central Valley Regional Water Quality Control Board

**TO:** Clay L. Rodgers  
Assistant Executive Officer

Dale W. Harvey  
Supervising Engineer

**FROM:** Joshua G. Mahoney  
Water Resource Control Engineer

**SAMPLE DATE:** 7 September 2017

**SUBJECT: NOTES FOR COLLECTION OF PISTACHIOS IRRIGATED WITH PRODUCED WASTEWATER WITHIN CAWELO WATER DISTRICT AND NON-PRODUCED WASTEWATER NEAR CAWELO WATER DISTRICT**

On 7 September 2017, Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff observed the collection of fruit samples by Advanced Environmental Concepts, Inc., a third party consulting group collecting samples on behalf of Cawelo Water District. Central Valley Water Board staff (Staff) obtained ownership of all samples throughout the sampling event. Fruit samples were shipped, via FedEx overnight delivery, to Weck Laboratories, Inc. (Weck), for analysis.

### **PARTIES PRESENT**

**Project Manager and Field Staff from Advanced Environmental Concepts, Inc. (AEC)**

**Superintendent from Cawelo Water District (Cawelo)**

**Central Valley Regional Water Quality Control Board (Central Valley Water Board)**

- Joshua Mahoney, Water Resource Control Engineer

**University of the Pacific, Stockton**

- Ben Grafius, Graduate Assistant for Dr. Stringfellow (Science Advisor)

### **GENERAL SAMPLING PROCEDURES**

Equipment:

1. Nitrile gloves.
2. Mason jars (hereafter sample container).
3. Ice chest.

Procedures for Handling Fruit:

1. Nitrile gloves were used at all times.
2. Pistachios were picked directly from the tree.
3. Fruit was placed in a sample container.
4. Samples were not shelled or altered between the tree and sample container.

5. Sample containers were sealed.
6. Sample containers remain in ice chest until delivered to the laboratory.

Sample Selection Criteria:

1. Minimum distance from main road was at least 100 feet.
2. Minimum distance from access road was at least 100 feet.
3. At each sample site, pistachios were picked from three different trees located within close proximity to each other.
4. All samples appeared to be ripe, ready for harvest.
5. Samples did not appear to have any unfavorable features or colors.
6. Samples appeared to be representative of what an average consumer would find at a store.

## SAMPLE ANALYSIS

The Chain of Custody specifies the following analysis:

1. Volatile Organic Compounds - US EPA Method 8260B (Full Analysis)
2. Semi-Volatile Organic Compounds – US EPA Method 8270C-SIM (Full Analysis)
3. Metals – US EPA 6020A & 6020B (CAM-17)
4. Methanol – US EPA Method 8015D

## SAMPLE SITES

### Site 1

Site Name: Pistachio 4  
Fruit Type: Pistachio

Crop Row: 25, 26, 27  
Crop Count from road: 10, 9, 9

Time at the Sample Site: 0640 - 0710  
Sample Name(s): Pis04-20170907-0643  
Pis21-20170907-0652 (dup)

Notes: Kerman Variety  
Duplicate sample collected. Drip irrigation system.  
Irrigated with blended produced wastewater (treated site).

### Site 2

Site Name: Pistachio 5  
Fruit Type: Pistachio

Crop Row: 25, 26, 27  
Crop Count from road: 10, 10, 10

Time at the Sample Site: 0719-0745  
Sample Name(s): Pis05-20170907-0721

Notes: Kerman Variety  
Drip irrigation system.  
Irrigated with blended produced wastewater (treated site).

Site 3

Site Name: Pistachio 8  
Fruit Type: Pistachio

Crop Row: 23, 24, 25  
Crop Count from road: 12, 12, 12

Time at the Sample Site: 0756-0819  
Sample Name(s): Pis08-20170907-0800

Notes: Kerman Variety  
Drip irrigation system. Sample location is the low point of the field with significant ponded water.  
Irrigated with blended produced wastewater (treated site).

Site 4

Site Name: Pistachio 9  
Fruit Type: Pistachio

Crop Row: 25, 26, 27  
Crop Count from road: 10, 10, 10

Time at the Sample Site: 0830-0856  
Sample Name(s): Pis09-20170907-0832

Notes: Kerman Variety  
Drip irrigation system. Field adjacent to this sample location was picked in July using farm equipment.  
Irrigated with blended produced wastewater (treated site).

Site 5

Site Name: Pistachio 10  
Fruit Type: Pistachio

Crop Row: 25, 26, 27  
Crop Count from road: 9, 9, 10

Time at the Sample Site: 0904-0923  
Sample Name(s): Pis10-20170907-0905

Notes: Kerman Variety  
Drip irrigation system. Some trees had limited fruit available.  
Irrigated with blended produced wastewater (treated site).

Site 6

Site Name: Pistachio 15  
Fruit Type: Pistachio

Crop Row: 25, 26, 27  
Crop Count from road: 11, 11, 11

Time at the Sample Site: 1020-1056  
Sample Name(s): Pis15-20170907-1023  
Pis00-20170907-1032 (dup)

Notes: Kerman Variety  
Drip irrigation system. Recently harvested and limited fruit was available.  
Irrigated with freshwater (control site).

Site 7

Site Name: Pistachio 14  
Fruit Type: Pistachio

Crop Row: 23, 24, 25  
Crop Count from road: 10, 10, 10

Time at the Sample Site: 1105-1130  
Sample Name(s): Pis14-20170907-1107

Notes: Kerman Variety  
Drip irrigation system.  
Irrigated with freshwater (control site).

Site 8

Site Name: Pistachio 16  
Fruit Type: Pistachio

Crop Row: 25, 26, 27  
Crop Count from road: 13, 13, 13

Time at the Sample Site: 1137-1158  
Sample Name(s): Pis16-20170907-1141

Notes: Kerman Variety  
Drip irrigation system. Field is adjacent to a major road.  
Irrigated with freshwater (control site).

Site 9

Site Name: Pistachio 17  
Fruit Type: Pistachio

Crop Row: 25, 26, 27  
Crop Count from road: 11, 11, 11

Time at the Sample Site: 1220-1252  
Sample Name(s): Pis17-20170907-1223

Notes: Kerman Variety  
Drip irrigation system. Majority of trees were planted two to four years ago.  
Irrigated with freshwater (control site).

Site 10

Site Name: Pistachio 1  
Fruit Type: Pistachio

Crop Row: 24, 25, 26  
Crop Count from road: 11, 11, 12

Time at the Sample Site: 1330-1400  
Sample Name(s): Pis01-20170907-1335

Notes: Kerman Variety  
Drip irrigation system. Cropland is located near Reservoir B.  
Irrigated with blended produced wastewater (treated site).

**SITE PHOTOS**

Photo 1 – Pistachio trees at Pistachio 1.

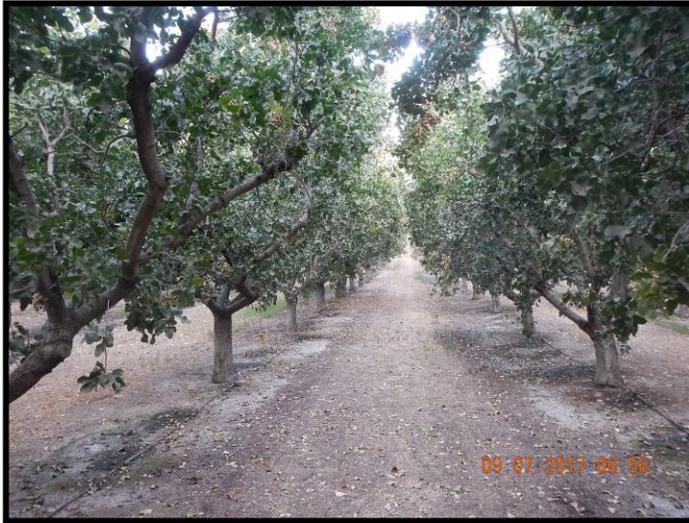


Photo 2 – Pistachio on trees at Pistachio 5.

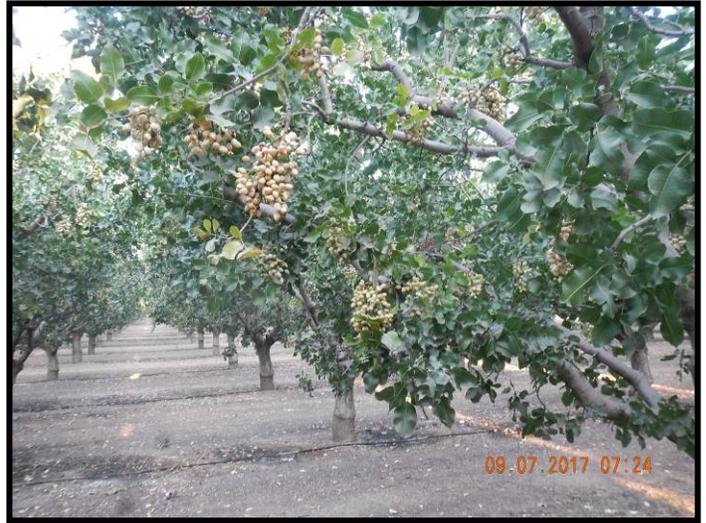


Photo 3 – Photo of pistachio samples at Pistachio 8.



Photo 4 – Picking pistachios at Pistachio 1.



Photo 5 – Photo of a sealed sample container.

