

Central Valley Regional Water Quality Control Board
Meeting Summary
FOOD SAFETY
EXPERT PANEL – PUBLIC MEETING
November 7, 2017
10 a.m. to 3 p.m.

Attendees

Panel Member	Title & Affiliation
Dr. Gabriele Ludwig	Associate Director, Environmental Affairs - Almond Board
Dr. Seth Shonkoff	Executive Director, PSE Healthy Energy; Visiting Scholar, Environmental Science, Policy and Management, UC Berkeley; Lawrence Berkeley National Laboratory (LBNL), Energy Technologies Area
Dr. Barbara Petersen (by phone)	Principal Scientist, Chemical Regulation and Food Safety, Exponent
Dr. Bruce Macler	Toxicologist, U.S. Environmental Protection Agency (US EPA)
Dr. Dave Mazzera	Chief, Food and Drug Branch, CA Department of Public Health
Dr. Ken Kloc (by phone)	Staff Toxicologist, California Office of Environmental Health Hazards Assessment
Dr. Andrew Gordus	Staff Toxicologist, California Department of Fish and Wildlife
Affiliated Parties	Title & Affiliation
Dr. Karl Longley	Chair of the Board, Central Valley Regional Water Quality Control Board (Water Board)
Stephanie Yu	Office of Chief Counsel, Water Board
Clay Rodgers	Assistant Executive Officer, Water Board
W. Dale Harvey	Supervising Engineer, Water Board
Rebecca T. Asami	Engineering-Geologist, Water Board
Dr. William Stringfellow	Science/Technical Advisor, University of the Pacific, LBNL
Dave Ceppos	Associate Director, Center for Collaborative Policy (CCP)
Alex Cole-Weiss	Assistant Facilitator, CCP

Note: Panel members Stephen Beam and Mark Jones were unable to attend the meeting.

Action Items:

1. **Water Board staff** to post the final meeting summary for the September Panel meeting on the project webpage.
2. **Water Board staff** to confirm the data range numbers listed in the presentation on mercury and radionuclides (particularly radium 226) and update as needed before posting the final presentation on the Water Board's webpage.

3. **Water Board staff** to check on the following items related to mercury and radionuclides (clarification be included in the meeting summary):
 - a. If the water samples taken for radionuclide testing were filtered ;
 - b. Who performed the mercury sampling analysis; and
 - c. How frequently mercury is sampled for.
4. **William Stringfellow and David Ansolabehere** to confer on the sharing of Cawelo Water District's datasets with Dr. Stringfellow (for reference and in support of the development of the more recent sampling reports).
5. **David Ansolabehere** to send final Memorandum of Understanding (MOU) signatory comments on Tasks 1 and 2 to the Water Board by November 17.
6. **CCP** to provide email comments and questions to Panel members and incorporate any further responses or clarifications by Panel members into the meeting summary.
7. **Water Board staff and CCP** to coordinate the scheduling of an internal meeting with Duke study team members, Water Board staff, and interested Panel members the week of December 4th.
8. **CCP** to revise the June and September public meeting dates to dates in July and October.

Introductions and Agenda Review

CCP facilitator Dave Ceppos reviewed the agenda and facilitated introductions from Food Safety Expert Panel (Panel) members, Water Board staff, CCP staff, and members of the public.

Mr. Ceppos said the Water Board received 30 form-letter style emails supporting the use of produced water. The standard letter reads as follows:

"I am writing to express my support for beneficial reuse of treated produced water. Water recycling and reuse is a key component of our state's water policy. Throughout Central California, beneficial reuse of treated produced water has been a reliable supply of water for irrigation for more than two decades. Treated produced water has provided help to meet agricultural water needs and reduce dependence on surface and groundwater. I urge you to stick to the science and continue to build off what is working so we can have a more reliable and sustainable water supply. Beneficial reuse of treated produced water should be part of the solution to California's water needs. Thank you for considering my comments."

He commented that an additional email was sent to the Water Board from Edward Jones; this email was a general notice for a documentary being made in support of treated produced water. The Water Board will be posting these comments on the project website as a matter of the public record.

Materials List

The following items were posted on the Water Board's Oil Fields Food Safety [web page](#) and hard copies were made available to all participants.

1. [Meeting Agenda](#)
2. [September 2017 Roundtable Meeting- DRAFT Summary](#)

Review of September Panel Meeting

The Panel held an internal working meeting on September 20, 2017. A draft summary of the September meeting was made available on the project webpage the week prior to the November 7th meeting. Mr. Ceppos asked Panel members if there were any additional comments or revisions that needed to be made on the summary. There were no comments from Panel members and the summary was adopted as final.

Update – Results of Summer 2017 Crop Sampling Events

Dr. Stringfellow gave an update on the summer 2017 citrus sampling events. (See [meeting materials](#) webpage for full presentation.) Preliminary analysis and results were presented publically on June 28, 2017. The draft analysis report was shared with the Panel on September 16 and discussed at the working Panel meeting on September 20, 2017. Panel members provided comment and the final report is under revision. Dr. Stringfellow confirmed that the detection of 1,2,4-trimethyl benzene was a false positive. The compound was probably limonene, a naturally occurring flavonoid. A major finding is that citrus sampled from areas irrigated with produced water showed no difference in the measured elements and compounds as compared with control samples from areas not irrigated with produced water. The only exception was strontium, which was found to be slightly higher in fruit irrigated with produced water. Strontium is a naturally occurring material and is not uncommon to be found in fruit. In all cases, the concentrations of all measured compounds were within normal limits.

Dr. Stringfellow explained he did a oneway analysis of the strontium data. The data showed a slight elevation; he also performed a t-test and determined the difference was marginally statistically significant. Differences may reflect difference in soil strontium concentrations, which may be naturally occurring. It may be some indication that it would be useful to examine soils for strontium accumulation. A Panel member commented that strontium is ubiquitous across the country at the levels present in the citrus data, and that US EPA data on strontium in soils indicate there is a relationship between strontium and calcium.

Dr. Stringfellow summarized the comments received to date from the Water Board and Panel members on the draft analysis report. Suggestions include:

- Add more explanatory text to provide context
- Add a detailed background section
- Provide further explanation of mass spectra results
- Discuss limitations, detection levels, etc.
- Add details on sampling procedures, site background, etc.
- Add appendix including all analytical results

Dr. Stringfellow will revise the draft analysis report to reflect comments.

Additional crop sampling occurred during July, August, and September. Given public comments about the need to sample root crops, garlic was added as a sample crop in addition to grapes, almonds, and pistachios. The analytical results were received in September and October. Dr. Stringfellow is in the process of analyzing the data from late summer sampling. At this point, there are no concerns with

regard to hydrocarbons or metals. Dr. Stringfellow reviewed next steps, which include writing the sample and analysis report, and planning for future studies and monitoring activities. The final report will include the full list of compounds that were tested for.

Questions from the Panel

- How many samples were taken (from treated and control sites)?
 - Response: Three from each at least, more in some cases.
- How were the control sites chosen?
 - Response: After identifying crop areas that are irrigated with produced water, we worked with the land owners to find areas they also farm that are not being watered with produced water. The idea is that the agricultural practices will be similar with the same landowner. All that the landowners that we have asked have been cooperative. We have concentrated our sampling in areas where produced water has been used for the greatest duration. The idea is that if there is any issue, it will be more likely to appear in the older fields.
- How was the garlic prepared for sampling? Did the lab take individual cloves and take the dirt off?
 - Response: The samples were collected and then sent to Weck Labs. Multiple cloves went into the glass sample container. At the lab they were peeled before extraction (no water wash).

Mercury and Naturally Occurring Radioactive Materials (NORMs) Water Quality Data History

As requested by during the June 2017 public meeting, Rebecca Asami, Central Valley Regional Water Quality Control Board, provided an overview of historical discharges for mercury and NORMs. See [meeting materials](#) webpage for full presentation.)

Under historical orders from the Water Board, water blending occurred in the Beardsley Canal. Later Cawelo Water District (the District) was permitted to discharge into Poso Creek. Under historical orders, operators sampled upstream and downstream of their discharge. The situation is different under current orders. Discharges occur in the Lerdo Canal.

Most mercury detects were from historical discharges and in the effluent. Data from historical discharges (from 2012 and prior) show the highest concentration of mercury detected was 0.06 micrograms/liter. Current orders require operators to sample regularly for mercury. Current and historical discharge data show there was no mercury detected at levels above the primary maximum contaminant load (MCL) for drinking water standards.

Dischargers are also required to sample regularly for NORMs, including gross alpha, radium 226, radium 228, and uranium. Sampling data for gross alpha show one hit above the MCL in 2016 (the sample was taken from Jasmine Mutual Water District pond). The data for radium 226 show no hits above the primary MCL. The data for radium 228 show one occurrence of exceeding the MCL in 2015. In that case

the sample was taken from discharge 001 (effluent) from California Resources to North Kern Water Storage District. The data for uranium show no hits above the primary MCL.

By means of comparison, Ms. Asami provided a 2016 water quality report from Cal Water—a company that provides potable water to the city of Bakersfield. As the report shows, mercury and NORMs are present in other waters and are not exclusively in produced water being sent to water districts for irrigation purposes. In closing, she provided resources for the public to learn more about Water Board sampling data, mercury, radionuclides, and the Cal Water Report.

Questions from the Panel

- What does a negative number mean in this context?
 - Response: Those numbers are likely equivalent to background counts. (See United States Geological Survey reference paper [here](#) for more information on methods for interpreting and reporting radiological water-quality data.)
- What type of mercury is being detected?
 - Response: Total mercury.
- With regard to the sampling methods for radionuclides, are the samples filtered before analysis?
 - Response: According to what's required for analytical methods, samples are filtered in the laboratory.

Long-term Public Outreach on Sampling Process

Panel member Seth Shonkoff provides comments on the long-term public outreach process regarding sampling. He emphasized the importance of making information transparent and conducting independent and scientific investigations. Other recommendations included:

- The analytical approach and methods should be communicated in a transparent fashion for the public to comment upon.
- After the public engages with the methods, the work should be conducted by scientists.
- Work products should go through a peer review process.
- Uncertainties and limitations of the work should be communicated through a variety of media. Public meetings is one approach. There should also be pamphlets and distilled information made available by the Water Board for the public. The Panel should review and provide feedback on these materials.

Public Comment

Mr. Ceppos asked for members of the public to comment:

- Laura Rosenberger Haider, by email: What were the exact locations from which the control samples were taken for these studies?
 - Response: In the analysis report (to be released soon) there will be generalized maps where the control and sample locations are. (Exact locations are private information.)
- Deb Wirkman, by email. In addition to the NORMs reported today, has the Panel also considered radioactive radio-tracer compounds that are not necessarily naturally occurring in the area, or

perhaps occur in natural concentrations but are also used for the purpose of petroleum exploration and extraction? For example, is strontium 90 ever used as a radio-tracer?

- Response: The Water Board has disclosures about what is being used on the fields. To our knowledge, the farmers are not using these type of materials on the fields.
- Deb Wirkman, by email. Who performed the mercury sampling and analyses that were reported today? How frequently are mercury and radionuclides sampled?
 - Response: Under current MRPs, dischargers test for mercury on a quarterly basis. Mercury is analyzed by accredited (ELAP) laboratories who follow standard methods.

Food Safety Project Update

Update from Cawelo Water District on MOU Task Implementation

David Ansolabehere, Cawelo Water District, gave an update on the MOU task implementation process. He summarized the water quality testing done by the District and for the Food Safety Panel Project to date. Testing has been performed quarterly since June 2016. There are now six sets of test results showing the water is high quality. Testing has been done between 2015 and today on a variety of crops, including almonds, grapes, pistachios, oranges, lemons, potatoes, and garlic. The crop sampling started as a voluntary effort initiated by the District to get the information out to the public. The data thus far show blended produced water is safe for irrigation.

The MOU signatories have signed the MOU and reviewed the scopes, and the group is ready to submit comments for tasks 1 and 2 by November 17. Since there are many other ways for chemicals to get onto the crops, the signatories have asked that the testing expand to include agricultural chemicals.

With regard to task 3 (sampling), Mr. Ansolabehere commented that the District has been engaged in sampling for the past 2 years and believe the data is good. One concern is the end date for testing, especially since there is no evidence to date that indicates any difference in crops irrigated with produced water. He acknowledged the importance of obtaining trade secret information and aligning testing with that information. Farmers are concerned that if the District has no control over the sampling and the crops, things could go awry. The testing needs to be controlled with the expectation that the samples are solely for the Water Board's Food Safety Panel project.

Clay Rodgers, Water Board, commented that the Board also wants to establish a clear timeline, but a sufficient dataset is necessary to complete the project. With the passage of Assembly Bill 1328 (Oil and gas water quality), the Water Board will be writing orders come January 1, 2018 to third party chemical suppliers to obtain additional information about chemicals used in oil and gas production. Under the new law, information on trade secret chemicals is confidential and will not be shared with the public, but that information will guide Water Board decisions. Another year of sampling needs to occur to address trade secret chemical information. It also provides duplication on the existing set of samples. Provided there is no significant change, the Water Board is considering when and how to obtain closure on Food Safety Panel project. The Water Board's goal is to demonstrate the safety of food to the public, and if that is not the case, the Board will take steps to correct that. Mr. Rodgers commented that if MOU partners want to expand the scope to include the agricultural chemicals and review those in comparison to oilfield chemicals, that is amenable to the Board

Questions and Comments from the Panel

- Can the District's results be incorporated into Dr. Stringfellow's report?
 - Response: Those reports have been provided to the Water Board and can be incorporated as references into the report.
- A Panel member commented that another round of sampling is needed and suggested to narrow the list of analytes based on results from previous sampling events.
- Can you clarify the thinking on expanding the list of analytes to include agricultural chemicals?
 - Response: The literature review included constituents of concern that are in agricultural and oilfield production chemicals. The MOU signatories want different potential sources of the compounds to be addressed in the sampling and analysis tasks. We are not looking for additional analysis, but recognition that the chemicals are in various media.
- Are pesticides currently dispersed with diesel fuel (as they used to be)?
 - Response: Mineral oils are used. There are definitely oil-like compounds used with pesticides.
- In the event that further sampling results in a change in what has been detected thus far, a Panel member suggested to perform a dietary intake assessment.

Public Comment

- Bill Allayaud, Environmental Working Group. I appreciate the amount of money the dischargers are spending on sampling. I am concerned there is a gap. There may still be chemicals in the water coming from the polishing ponds. I suggest sampling the water in the ponds, then again after blending, the soil, and then lastly the fruit. The fruit is not likely to be contaminated. I am more interested in the soils and the root crops. Also, I am concerned that one of the permits allows the use of produced water for aquaculture and livestock.
 - Response: Extensive testing of the water occurs at the polishing ponds. We have a good understanding of what is in the water. The Water Board may add the additional constituents after January 1. Soil sampling has been part of this conversation, but the focus of the Panel is on food safety. The Water Board has consulted with botanical experts on the way chemicals might move through soils and plant tissues. I would like to have Dr. Banuelos (Fresno State and US Department of Agriculture researcher) share information on plant uptake with the Panel. The control samples help answer some of the questions about other sources of chemicals that might be confounding.
 - Follow-up: Is the water sampling data available online? Does it only include chemicals for which there are MCLs for drinking water standards? I thought that irrigation water does not have standards.
 - Response: The water sampling data is available online and includes chemicals beyond drinking water standards, some of which do not have MCLs for drinking water standards. With AB 1328, the Water Board may address some exotic chemicals for which we may not have reliable methods. We are also looking at "daughter products" when chemicals mix and/or degrade. With regard to irrigation water, there are issues with naturally occurring compounds; for example, irrigators do not test for arsenic. Tasks 1 and 2 address the list of analytes and will explore which chemicals are of concern.

- Follow-up: The environmental non-profit organization Water Defense did sampling and found hydrocarbons on some of the fruit. They were criticized for their methods (grab sampling). I would like for the Water Board to be able to say their approach is sound and robust.
 - Mr. Rodgers commented that he and Dale Harvey met with the individual from Water Defense to discuss the methods used. The Water Board has serious concerns with the sampling methods. The Water Board does extensive quality control to make sure results are robust. Water Defense did not provide any quality assurance or quality control information for the sampling they conducted. One concern the Water Board had was that the analysis detected acetone, a common laboratory contaminant. Also, the sampling was done with off-the-shelf equipment using passive sampler—a device that sits in the water column and presumably absorbs the material. The Water Board was unable to validate the quality of the methods used by the individual from Water Defense, and with the data made available, the Water Board did not think it was reliable.
- Jane Sooby, California Certified Organic Farmers. I appreciate the openness and posting of materials since it is hard for a layperson to understand all the materials and processes. I am glad you sampled garlic and would like to see carrots and potatoes as well. They may be taking up compounds not taken up by garlic. It will be important to control for ripening in the next round of sampling. I reiterate the request to the Panel to consider soil sampling and I am still concerned about soil accumulation. Organic growers are under an obligation not to hurt the soil and want to know what the soil impacts are with the use of produced water.
 - Response: We did not sample carrots or potatoes because there were none of those crops grown that were irrigated with produced water. There is a lot of conversion to permanent crops. With regard to compounds and ripening fruit, we are currently sampling fruits being picked by the growers since that is representative of what is going to market. Do you have any recommendations about the timing?
 - No, and I do not have a technical background to address this. I just want to ensure that the samples have a note about the level of ripeness to help control for the issue of compounds related to ripening.
- Laura Rosenberger Haider, by email. I predict that after the studies are complete, oil companies would use more hydraulic fracturing chemicals to drill deeper. It will be interesting to see how much these chemical levels in crops increase after a year especially in a drought. Some species are bred to absorb less minerals. I would like to know if glyphosate was ever used on the crops or fertilizer to inhibit mold. It also chelates minerals and decreases plants' absorption of minerals. I would also like to know how the levels of toxic metals in organic crops compare to conventional crops.
- Deb Wirkman, by email. It's concerning to me that some potentially toxic contaminants from blended produced water that may be present in fruit and other produce are difficult or even impossible to analyze. I don't think that safety can be declared if this is the case. It must be made clear to the public that there are limits to analytical capabilities versus the range of chemicals that are involved in petroleum production.

- Response: With regard to chemicals that we do not have good testing methods for, task 1 and 2 includes addressing the mass of materials used. There are other mechanisms to look at these chemicals without direct analysis in the water.

Long-term Critical Path

Mr. Ceppos said the project is moving onto a quarterly public meeting schedule. Planned public meetings on January 24, April 25, June 27, September 26. They will be held in Rancho Cordova. There will also be periodic internal working meetings of the Panel. Mr. Rodgers requested the dates be revised to hold the third and fourth quarterly meetings in July and October. The meetings are tentatively scheduled for 24 January, 25 April, 25 July, and 24 October.

Mr. Ceppos asked about expected actions the Water Board will take on January 1, 2018 with regard to trade secrete chemicals and the timeline for receiving information. Mr. Rodgers said that the orders will likely include a 30-day response period. Most of the information received will not be shared with the public. The next crop to be sampled will be citrus. The Water Board wants to sample by the end of February, so the contractor needs to be on board by the end of January under the approved MOU task scopes. The Water Board should receive responses to information requests by early February. By the end of February, the Water Board will determine if any modification of analyses is appropriate. Dr. Stringfellow commented that he is archiving samples for future analysis if necessary.

Questions and Comments from the Panel

- Are there analytical tests available to expand the list of chemicals?
 - Response: It depends on the compounds we want analyze. The focus so far has been on compounds that have an impact on public health and that have good analytical methods.
- The data thus far show there is no concern with regard to the current list of analytes. We need to be clear about the list of analytes and the limitations on sampling techniques. We have very little information on the majority of the compounds we are considering, given the original list of analytes we looked at. We should not extend any conclusions to things we do not know about.
- For analytical methods for emerging contaminants, it is more useful to look at the water first, rather than the fruit.

Update – Duke/RTI/CSUB/PI Study

Mr. Ceppos reminded attendees that the Panel discussion on the Duke study is memorialized in the September 20th meeting summary. The action item that came out of that meeting was to schedule an alignment meeting to discuss areas of overlap and other issues. Dale Harvey said he was in contact with the study team. The Water Board is hoping to schedule an internal, in-person meeting with the team in early December. Mr. Ceppos commented that Dave Ansolabehere indicated the team had contacted him about coming to California, but that they have not requested site access up to this point. Panel members did not have any further comments on the study. Mr. Rodgers encouraged Panel members to attend the meeting if interested.

General Public Comment

Mr. Ceppos asked for general public comment from members of the audience. Water Board staff read aloud comments received by email.

- Nick Ortiz, Greater Bakersfield Chamber of Commerce. Water is the lifeblood of our economy. We are blessed that we have oil and gas, and agriculture in our economy, and we have seen them partner before. Beneficial reuse is a win-win. I agree there is a need to be transparent. The work done to date shows that food crops grown with produced water are indistinguishable from those grown without. I hope to continue to communicate that to the public.
- Beatris Espericueta Sanders, Kern County Farm Bureau. I represent farmers and irrigated farmland in the Cawelo Water Districts. On behalf of those growers, I think that this approach and collaboration between agriculture and oil should be applauded. The practice should be researched further, but the timeline is up to you. Remember that the agriculture industry is not separate from the public. My family are growers. Other districts are considering this as an option. I think this is a credible water source.
- Ed Hazard, California Chapter of National Association of Royalty Owners. I represent private oil royalty owners and I also have a background in agriculture. I am excited about what has been done. As royalty owners and agricultural producers, we are concerned about the quality of soil and water. I am proud that there are strict environmental standards. The work appears thorough and scientifically based. I urge you to speed the process along. To the extent we can reuse this water, it is a great benefit to agriculture and oil companies. Thank you for looking out for us.

Closing

Mr. Ceppos thanked participants for attending and adjourned the meeting at 1 pm.