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27 September 2010

Bill Jennings, Executive Director
California Sportfishing Protection Alliance
3536 Rainier Avenue
Stockton, CA 95204

Subject: Monitoring Requirements for Compliance with the Irrigated Lands Regulatory Program.

You've asked me my opinion in the form of several questions about water quality monitoring. These questions are within the context of the irrigated lands regulatory program that deals with farmland and the water runoff from these lands into receiving waters in the State of California.

I am a professional geologist specializing in water chemistry, water quality, groundwater, and engineering geology. I hold professional licenses and certifications issued by the State of California for these practices, and operate a private consulting business providing these services. I have more than twenty-five years experience evaluating natural and contaminant water chemistry problems and issues. Eleven of those years were working for the California State Regional Water Quality Control Board on water quality issues related to the impacts and remedies of water pollution from industrial and cultural activities. My experience includes the development, preparation, and review of hundreds of water quality monitoring programs involving surface water as well as groundwater systems. A true and correct copy of my curriculum vita is attached.

You asked if it is possible to protect the beneficial uses of waters of the State without monitoring those waters. The answer is a simple no. Protection of beneficial uses of waters of the State is function of the ability to monitor those waters to determine their quality. This done to verify their conformity to water quality standards and goals as defined in the Basin Plan.

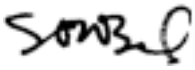
You asked if it was possible to evaluate the effectiveness of a water treatment system or of a management practice at a farm without monitoring the discharge. My answer is no. Evaluating the effectiveness of a technology or a practice requires that the change in water quality attributable to the specific practice or technology be verified. To do that a reference sample from the point of discharge and then a comparison sample taken from the same location after the technology or practice is implemented must be collected and analyzed. In actual practice, multiple samples over range of operating conditions must be collected to verify positive changes.

You also asked if it was possible to evaluate the effectiveness of a water treatment system or of a management practice at a farm from a distant downstream monitoring location. The basic answer is no. In such a case, before the samples are collected, the discharge is mixed and diluted in the receiving water with other sources of pollution from other farms. Any changes in water quality that may occur at the discharge are masked within this soup of waters and pollution and the performance of the technology or practice are essentially unknowable.

You asked if the downstream water quality of a complex watershed composed of multiple sub-watersheds, is a valid measure of the water quality in any or all of the individual sub-watersheds. My answer is no. While gross average conditions may be observed downstream, the conditions of individual upstream sub-watersheds will remain unknown. Between the downstream monitoring station and the various upstream watersheds, mixing and dilution occurs and the conditions at any upstream point are obscure to the downstream location.

I've attached a 26 May 2003 letter from me to the Chairman of Central Valley Regional Water Quality Control Board on the subject of the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Central Valley Region. This letter also addresses many of the issues associated with water quality monitoring of irrigated lands.

Sincerely



Steve Bond PG, CEG, CHG
Principal, Steven Bond and Associates

Attachments

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26 May 2003

Mr. Robert Schneider
Chairman, Central Valley Regional Water Quality Control Board
3443 Routier Road, Suite A
Sacramento, CA 95827-3003

Subject: Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Central Valley Region, 24 April 2003

Chairman Schneider and Members of the Board.

I have reviewed the proposed Monitoring and Reporting Programs (MRP) for the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Central Valley Region which was prepared for the 24 April 2003 Regional Board hearing. I prepared this letter on 23 May 2003 but was unable to transmit because I lacked various information available only on the Regional Water Quality Control Board Web Site, which was unavailable at that time. I was informed today that the deadline for comments was extended due to technical problems with that web site. I am submitting this letter on behalf of the DeltaKeeper and Water Keepers of Northern California.

I find that the proposed MRP and associated Quality Assurance Project Plan are impressive documents with many positive elements to offer for the protection of water quality. However, in certain respects the proposed MRP is too general and provides loop holes that may result in less than adequate monitoring data.

I am a professional geologist specializing in water chemistry, water quality, groundwater, and engineering geology. I hold professional licenses and certifications issued by the State of California for these practices, and operate a private consulting business providing these services. I have eighteen years experience evaluating natural and contaminant water chemistry problems and issues. Eleven of those years were working for the California State Regional Water Quality Control Board on water quality issues related to the impacts and remedies of water pollution from industrial and cultural activities. My experience includes the development, preparation, and review of hundreds of water quality monitoring programs involving surface water as

well as groundwater systems. A true and correct copy of my curriculum vita is attached.

The decades of growth and development of the Central Valley and its agricultural industry has coincided with the decline of the quality of the Central Valley waterways. Although this decline is a matter of record, discharges and runoff from irrigated agriculture and other agricultural operations have contributed to this decline in ways that are often difficult to quantify. They are not easily quantified because because critical monitoring programs were not in place to require the collection of essential data.

Water Quality Monitoring Fundamentals

Monitoring is the central supporting element of water quality protection and conservation. All actions to protect and safeguard our water resources rely on what the monitoring informs us about the conditions of the water bodies. Monitoring programs are like the physical senses; they are the faculties which we perceive the conditions of the water bodies. Without monitoring, we are blind to all but the grossest conditions in our rivers, streams, and lakes. Further, a poor or inadequate monitoring program provides us with questionable information and ambiguous clues to guide us in making intelligent decisions regarding water quality control.

A valid monitoring program usually begins as a well-reasoned plan. It will include an assessment of water flow onto and off of an area of possible or potential pollution, and contaminants. It will include an assessment of all the potential sources of pollution and contamination and identify the elements and constituents associated with the sources. The elements can include individual constituents as well as possible adverse effects of combinations of individual constituents and or conditions. These effects will be measured as toxicity. The well-reasoned plan will address the representativeness of sample collection by the method and timing of sample collection and measurement.

A well-reasoned water-quality monitoring plan is based on a thorough understanding of flow paths and physical and chemical quality of the water moving through a watershed. This will include an understanding of the variability of the flow and quality of the water over time, and at different locations within the watershed. This understanding of the watershed becomes the standard by which subsequent monitoring data can be measured or judged. Definition of existing conditions within a

watershed will require, at a minimum, the monitoring of a full annual cycle of climatic changes. However, multiple years of data are needed to address variations in the annual cycles.

A good understanding of a watershed (existing-conditions) is highly desirable; it is usually essential. Lacking good understanding of the existing-conditions, the only option left is to measure the quantity and quality of water before (background) it enters the critical area of the watershed (project area), and then conduct identical monitoring of water as it passes from the project area. In this latter case, the background water quality becomes the standard, or benchmark which the down-river water quality can be measured and judged.

Monitoring Point Locations

Valid monitoring data can only be collected from logical points of monitoring placed within the flow path of the discharges from the potential sources of pollution (the agricultural lands) into the receiving waters; the waters of the State.

Monitoring Parameters

A reasonable water-quality monitoring program will track physical and chemical constituents of interest (constituents of concern) specific to the discharge from a source and, will define the mass of contaminants discharging from the source. The constituents of concern will include each constituent reasonably expected to come from the agricultural operation. Constituents of concern will also have the potential to impair the beneficial uses of the receiving waters, or they will be indicators or surrogates of such pollutants.

Sample Collection Timing

Sample collection must coincide with the most likely period of time that discharge of pollutants would occur. In many cases pesticide and fertilizer application occurs only at certain times of the year and these times vary depending on the crop. Consequently a valid plan will address these variables.

Monitoring Cost Estimates

A wide range of alternative technologies exist to assist the responsible parties in efficient and cost conscious data collection. When attempting to assign a dollar cost to monitoring project, it is not reasonable to assume the that the most labor intensive sampling and analytical techniques should be used.

Monitoring Station versus Watershed Area

The proposed MRP is excessively lenient where it indicates that 20 square kilometers (5000 acres) of watershed will be a maximum area allotted per monitoring point. This language will tend to encourage dischargers to design monitoring plans around this figure and in doing so will undermine the quality of monitoring data.

For example, a monitoring plan with a large watershed and few monitoring points will inevitably have a number of small tributary water bodies located between a single monitoring point and a potential source of pollution. These small tributaries will alter the character and quality of the water and the sampled water will not be representative of the water quality impairment immediately down stream of a particular discharge. Such a program will deliver misleading and incomplete information with respect to receiving-water water quality conditions. This will result in contradictory or ambiguous conclusions with respect to the performance of any mitigation measures, or lack thereof, at the project area.

Emphasis should be placed on the requirement that each discharge point be monitored and that each sample collected be representative of the discharge water quality. The size of an area represented by a monitoring station should be a function of the number of discharges from a specific agricultural operation.

Summary

An adequate monitoring program is a valid program. It will assess the impacts to the state's waters from agricultural operations and it will require monitoring stations at the point(s) of discharge. A valid monitoring program will monitor for all constituents of concern as well as toxicity. It will assess the total mass of pollutants discharging from individual agricultural operations and it will also include a comprehensive ambient (background) monitoring program.

Sincerely

Steve Bond
Principal, Steven Bond and Associates, Inc.

Attachment

California Sportfishing Protection Alliance
Hearing in the matter of the Irrigated Lands Regulatory Program Framework
Before the Central Valley Regional Water Quality Control Board
Testimony of Steve Bond
7 April 2011

My name is Steve Bond, I'm a member of the California Sportfishing Protection Alliance, I am also a professional geologist specializing in water chemistry, water quality, groundwater, and engineering geology. I've professional licenses for these practices, and I have a private consulting business providing these services. I've more than twenty-five years experience evaluating natural and contaminant water quality issues, eleven of those years were in the employ of this Regional Water Quality Control Board. My experience includes the development, preparation, modeling and review of hundreds of water quality monitoring programs involving surface water and groundwater systems in the capacity of a regulator, as a consultant, and as an expert before State and Federal courts.

It is my professional opinion that the ILRP, as an enforceable program, is without merit. It lacks teeth, so-to-speak. The polluters are in effect not accountable for their actions or inactions. It is without actual monitoring associated with sources of pollution. The identity and location of the dischargers of pollution are allowed to hide behind the coalition shield, and are identified only through third party groups who are themselves not accountable. In Contrast, Traditional monitoring does have merit; traditional monitoring is enforceable, holds the makers of pollution accountable for their pollutants within a structure of goals and time schedules for compliance; the ILRP does not do these things.

My professional opinion is that one cannot protect WQ without representative monitoring. Protecting WQ is function of the ability to determine the condition of the State's waters and compare and contrast their quality with the standards and goals defined in the Basin Plan. . . It is not possible to protect the beneficial uses of waters of the State without monitoring the waters and the pollutants discharged into them. And yet, the current plan proposes no representative monitoring.

It is my professional opinion that one cannot evaluate the effectiveness a technology or practice without measurement. Evaluation requires that the change in water quality attributable to the specific practice or technology be measured. But, the ILRP fails to require this basic requirement.

My professional opinion is that it is not possible to evaluate the effectiveness of a water treatment system or of a management practice from some distant downstream monitoring location. In such cases, the discharge is mixed and diluted in the receiving water with other sources of pollution. Any changes in water quality from a practice or technology, that is discernible at the edge of field, are masked within a soup of other waters and pollution, and the performance of the BMP is essentially unknowable. Yet, that is the

state and condition of this program.

My professional opinion is that in a complex watershed composed of multiple sub-watersheds, water samples from distant downstream locations, such as most of the monitoring locations in this program, are not valid representations of the water quality in any or all of the individual sub-watersheds. While gross average conditions may be observed downstream, the conditions of individual upstream sub-watersheds will remain unknown. Between the downstream monitoring station and the various upstream watersheds, mixing and dilution occurs and the conditions at any upstream point are obscure to the downstream monitoring location. And yet, that is the state of the majority of the program's monitoring.

The most basic step towards rectifying the condition of degraded waters, is to identify all the points of discharges and monitor the quality and quantity of those waters from the edges of their fields. Traditional monitoring is enforceable, holds the makers of pollution accountable for their pollutants within a structure of goals and time schedules for compliance.

California Sportfishing Protection Alliance
Hearing in the matter of the Irrigated Lands Regulatory Program
Before the Central Valley Regional Water Quality Control Board
Testimony of Jo Anne Kipps
7 April 2011

I am Jo Anne Kipps and I am on the CSPA Advisory Counsel. I am a California-registered civil engineer. I worked for the Central Valley Water Board for over 12 years in the NPDES and WDR Regulatory Programs. As Senior Water Resource Control Engineer, I supervised staff's preparation of waste discharge requirements orders for surface water and land discharges. And, I supervised staff's evaluation and enforcement of dischargers' compliance with these requirements.

It is my professional expert opinion that the Framework's recommended Program will not protect water quality. To be effective, a regulatory program must include the following. It must identify, then directly regulate the persons responsible for discharging waste. It must require them to characterize their waste for both quality and quantity to yield mass pollutant loads. It must require them to comply with waste discharge requirements designed to protect and restore water quality. It must require them to submit representative and reliable data characterizing source water, discharge, and receiving water at specified locations. This data is critical to evaluate a discharge's effect on receiving water and compliance with water quality objectives. And, most importantly, it must subject them to enforcement should they violate Board-issued Orders.

The Framework's recommended program cedes the Board's regulatory responsibility to third parties. It defers waste characterization indefinitely. It proposes an inadequate regional monitoring scheme that cannot and will not provide information necessary to characterize current conditions, let alone monitor the effectiveness of best management practices as these are implemented. And, perhaps most importantly, it makes enforcement against those dischargers responsible for causing pollution improbable. Without enforceability, the Framework's recommended Program is essentially a voluntary one that cannot and will not protect water quality.

Because irrigated agriculture has caused widespread groundwater nitrate pollution, it is my professional expert opinion that the program must consider all irrigated agricultural operations as posing a high risk to groundwater unless proven otherwise. The program must require all growers to submit data on their supply wells for nitrate and other constituents of concern. This data is necessary to establish baseline conditions and to evaluate the effectiveness of improved nutrient management.

California Sportfishing Protection Alliance
Hearing in the matter of the Irrigated Lands Regulatory Program Framework
Before the Central Valley Regional Water Quality Control Board
Testimony of Richard McHenry
7 April 2011

Good Morning Board Members
I am Richard McHenry
I am a civil engineer
I am here today representing the California Sportsfishing Protection Alliance.

I worked for the state and regional water boards for about 23 years. Much of that time was spent as a senior engineer in the NPDES unit overseeing permits for wastewater discharges to surface waters. My final assignment with the boards was as a senior engineering specialist in the Office of Enforcement at the State Water Board.

I have considerable experience in developing wastewater discharge permits, investigating water quality issues and developing enforcement actions for both permitted and unpermitted discharges.

The recommended Irrigated Lands Regulatory Program Framework proposes that regional monitoring be conducted, not monitoring at individual discharge points.

My professional opinion is that enforcement against an individual discharger cannot be based on regional monitoring. It must be proved that a specific discharger caused a specific violation. In this case, regional impacts could have been caused by any number of upstream dischargers or circumstances and cannot be directly linked to any specific discharge point.

Based on the regional monitoring that is being proposed, I cannot see any reasonable means of taking enforcement against individual dischargers to effectively protect water quality.

I also cannot see any means of utilizing regional monitoring to evaluate the effectiveness of farm specific best management practices.

In summary, there **is** currently sufficient data showing that agricultural discharges are degrading water quality,

But, the data is insufficient to show the precise point discharges causing the problem or to determine if any corrective measures are effective.

The Regional Board has qualified engineers, geologists and scientists. Given the right tools, they have the ability to solve the water quality problems. They do not have the proper tools now and the proposed program does not give them the proper tools.

Under the proposed program, it is unlikely that progress will be made to improve water quality.

Thank you.

G. Fred Lee & Associates

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Sent via email to ILRPcomments@icfi.com
ILRP Comments
Ms. Megan Smith
630 K Street, Suite 400
Sacramento, CA 95814

September 25, 2010

Comments on
Draft Program Environmental Impact Report for a Waste Discharge Regulatory Program for Irrigated Lands within the Central Valley Region
Submitted by

G. Fred Lee, PhD, AAEE Bd. Cert. Env. Eng., F.ASCE
Anne Jones Lee, PhD
G. Fred Lee & Associates
El Macero, California

In response to a request for comments on the Draft Program Environmental Impact Report for a Waste Discharge Regulatory Program for Irrigated Lands within the Central Valley Region we wish to submit these comments.

Overall we find that the five alternatives listed in the draft EIR are not necessarily appropriate for providing guidance for establishing the future direction of the Central Valley Irrigated Lands Regulatory Program (ILRP). Adoption or continuation of any of the five alternatives, including the current program, cannot be expected to achieve the regulatory goals of protecting the water quality/beneficial uses of Central Valley waterbodies that are impacted by discharges/runoff from irrigated lands. Based on my (G. Fred Lee) more than 40 years of experience in development and implementation of water quality programs some of which have been directed to agricultural sources of pollutants, whichever of those alternatives the Central Valley Regional Water Quality Control Board (CVRWQCB) may adopt, it will be challenged by environmental groups and, if not overturned at the state (State Water Resources Control Board-SWRCB) and federal (USEPA) levels, it will likely be found by the courts to fail to fulfill the regulatory requirement to protect the water quality of Central Valley waterbodies from adverse impacts of discharges from irrigated lands.

The CVRWQCB Monitoring and Reporting Program Order No. R5-2008-0005 for Coalition Groups under Amended Order No. R5-2006-0053 Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Adopted in 2008 states:
"MRP OBJECTIVES
The Water Code mandates that monitoring requirements for a Waiver be designed to verify the

adequacy and effectiveness of the Waiver's conditions. One of the conditions of the Waiver is that discharges of waste from irrigated lands to surface waters of the State shall not cause or contribute to an exceedance of an applicable water quality standard."

This requirement means that, in accord with the Clean Water Act and the CWRWQCB, none of the water quality objectives (WQOs), including numeric and narrative objectives and covering all impairments of the designated beneficial uses of the state's waters, can be exceeded by any amount more than once in a three-year period. This requirement applies to all of the state's waters.

It is important to understand that just meeting all of the US EPA water quality criteria/ CVRWQCB water quality objectives for potentially toxic chemicals as required in the ILRP does not ensure protection of aquatic life from toxicity of the known potential pollutants as well as of chemicals for which there are no water quality criteria; a combination of potentially toxic chemicals in concentrations less than their respective toxic concentrations can cause toxicity by additive and/or synergistic effects. While additive and synergistic toxicity impacts are well-known to occur, the US EPA does not incorporate that information in its aquatic life criteria for potentially toxic chemicals that are used for the regulation of toxic chemicals based on numeric water quality standards. The CVRWQCB WQOs only consider a very limited number of additive impacts of mixtures and do not address synergistic impacts. This deficiency can be addressed to some extent through the appropriate measurement of aquatic life toxicity, and highlights the need to evaluate aquatic life toxicity in establishing compliance with water quality criteria/objective to protect aquatic life resources of the Central Valley waterbodies from the impacts of toxic chemicals in irrigated agriculture runoff/discharges. However the use of toxicity measurements will need to be greatly expanded from the current use to achieve this approach.

Comments on proposed alternatives identified in the draft ILRP EIR for governing the future direction of the ILRP follow.

Alternative 1 ("No Project" Alternative). This alternative of continuing the current regulatory program falls far short of adequately defining the occurrence and water quality impacts of irrigated lands discharges/runoff. The current program is based on the "Monitoring and Reporting Program Order No. R5-2008-0005 for Coalition Groups under Amended Order No. R5-2006-0053 Coalition Group Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands Adopted on 25 January 2008." A copy of that program is available at:
http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2008-0005_mrp.pdf.

We provided detailed comments (see attached list of papers and reports) on significant technical deficiencies in that monitoring program for the development of an information base upon which it would be possible to reliably evaluate the occurrence and significance of the discharge of pollutants from irrigated lands that cause violations of water quality standards in the state's waters and/or impairment of the beneficial uses of Central Valley waters in the case of nutrients, TOC, and other contaminants for which no numeric water quality objectives have been adopted.

Our comments on technical deficiencies in that monitoring program are available on our website, www.gfredlee.com, in the Surface Water Quality section, the Agricultural Impacts on Water Quality subsection. A copy of our specific comments on the then-final ILRP MRP is attached. Also attached is a discussion of some the issues that need to be considered in developing the ILRP to achieve the program requirements.

While some of the then-proposed water quality monitoring program deficiencies were corrected by the staff after receiving our comments, there were several major deficiencies that were allowed to be implemented in the current water quality monitoring/evaluation program the most important of which is the failure to adopt edge of the field and upstream monitoring. It appeared to us that the CVRWQCB took the position that it would ignore these deficiencies in order to reduce the cost of water quality monitoring/evaluation and thereby gain acceptance of the irrigated lands regulated community to participate even to a limited extent in the monitoring program. To now propose to continue what is obviously a significantly deficient monitoring/evaluation program as proposed in *Alternative 1* is not acceptable.

In our previous comments we stressed the need for monitoring at the edge-of-the-field and in nearby state waters to define the worst-case impacts of toxic and other chemicals discharged from agricultural activities. In some waterbodies the worst case impacts could be detrimental to fish spawning/rearing areas that would not be detected by the current downstream at a single monitoring location as practiced in the current monitoring program. This type of monitoring is also essential to evaluate the effectiveness of management practices to control WQO violations in the states waters. We also discussed the need to monitor downstream of the current monitoring locations to evaluate the impact of nutrients on downstream water quality.

The staff-recommended alternative analysis of costs and other impacts presented in the draft EIR does not reflect the true costs to achieve reasonably complete evaluation of the current water quality problems caused by irrigated agriculture discharges to surface and groundwaters. The deficiencies in the ability of the current water monitoring program to provide a proper description of the magnitude of the water quality problems caused by current agricultural discharges render the detailed analysis of these issues presented in the draft EIR unreliable. Without a technically solid assessment of water quality problems that arise at edge of the field and downstream, it is impossible to reliably estimate the control programs needed, much less the cost of implementation of control programs or their impacts on agricultural activities or water quality in the Central Valley. While a considerable amount of money has have been spent on limited aspects of the current downstream water quality monitoring, it is not possible to estimate the cost of a comprehensive water quality monitoring program that can detect essentially all the WQO violations that occur upstream, and for nutrients downstream, of the current water quality ILRP monitoring locations.

If this program is to fulfill the regulatory requirements of the program, the future water quality monitoring/evaluation program for the ILRP must include comprehensive monitoring of representative edge-of-the-field discharges and waters downstream from the discharge for the full range of potential pollutants that are likely to be in the agricultural discharge/runoff or to develop downstream as a result of the discharge. Where the discharge of pollutants (constituents that impair designated beneficial uses of the state's waters) is found, the discharger(s) should

evaluate and implement to the extent economically possible/feasible control measures for the pollutants at the source. The monitoring and evaluation of the pollutant control programs must be comprehensive such that it can provide a reliable foundation for developing and assessing the economic feasibility of implementing the pollutant control program.

Alternative 2 — Third-Party Lead Entity includes third-party monitoring of surface waters and is expanded to include some groundwater quality monitoring. The expansion of the ILRP to include evaluation and potential control of pollution of groundwater by irrigated lands is an important step toward beginning to protect the groundwater resources of the Central Valley. In our previous comments on deficiencies in the ILRP we have repeatedly pointed out that the control of groundwater pollution should be part of the program. Our comments on groundwater pollution in the Central Valley by irrigated agriculture are available on our website in the Groundwater Quality Protection section at http://www.gfredlee.com/plandfil2.htm#gwprotection. A list of our papers and reports that address issues of groundwater pollution by irrigated agriculture is attached to these comments. As discussed in those writings, it has been well-established that irrigated agriculture cannot be practiced without causing groundwater pollution by salts and nitrate. The best that can be achieved is the minimization of groundwater pollution. This should be the goal of this part of the program.

The draft EIR does not provide adequate information on the characteristics of groundwater monitoring program to develop a reliable early warning monitoring program to detect management activities by agriculture to protect groundwater from further pollution. This approach is discussed in our reports concerning the protection of groundwater quality in the Central Valley. Without this information it is not possible to estimate the costs for implementation of the program.

The claim made by several agricultural representatives at the CVRWQCB September 22, 2010 meeting, that nitrate and salts do not pollute deeper groundwater because of depth to groundwater, is not technically valid. Examination of the groundwater pollution that has occurred in the Delano and McFarland areas of the Central Valley readily demonstrates the invalidity of their claim. Having grown up in Delano, G. Fred Lee is well-aware of the pollution of the area groundwater by agriculture-derived nitrate to the point that the nitrate MCLs were exceeded in water in municipal water supply wells. While some pollutants have limited ability to penetrate the unsaturated zones of aquifers, others, such as salts, nitrate and some pesticides, have limited attenuation in the unsaturated zone; it is only a matter of time before such chemicals in the surface soils pollutant the saturated zone (water table) of the aquifer.

Alternative 2 is deficient, however, in its not requiring early-warning monitoring for groundwater pollution. Without reliable monitoring of that type it is not possible to evaluate the effectiveness of the groundwater management plans.

Alternative 3 — Individual Farm Water Quality Management Program is based on "visual" monitoring. This is not a technically valid approach for controlling water pollution by irrigated agriculture. Evaluation of Farm Water Quality Management plans must be based on comprehensive water quality monitoring at the edge of the field and for nutrients downstream of

the discharges where nutrients are impacting water quality such as in the Delta.

Alternative 4—Direct Oversight with Regional Monitoring is a potentially feasible approach provided that adequate surface and groundwater quality monitoring/evaluation and control of pollutant discharges are achieved including comprehensive edge of the field and downstream monitoring.

Alternative 5 — Direct Oversight with Farm Monitoring has the potential of being effective provided that comprehensive monitoring programs are implemented. However based on the past experience where the CVRWQCB adopted.allowed water quality monitoring programs that were obviously technically deficient there is concern the needed programs would not be required. The cost of this approach would likely cause the approach to not be implementable by small farms. This approach could potentially be used by larger farming interests, but, again, there will be need for comprehensive surface and groundwater monitoring/evaluation and management.

Rather than adopt a single alternative, or a combination of the alternatives, the CVRWQCB needs to first implement a comprehensive water quality monitoring program for surface and groundwaters. With several years' data from such a program it would be possible to start to develop a draft EIR that could reliably assess and outline the cost and effectiveness of control programs for pollutants in surface and groundwaters.

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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September 27, 2010

Mr. Michael Lozeau
Lozeau | Drury LLP
1516 Oak Street
Alameda, California 94501

Subject: Comments on the Draft Program Environmental Impact Report for the Long-term Irrigated Lands Regulatory Program

Dear Mr. Lozeau:

I have reviewed the "Draft Program Environmental Impact Report (PEIR) for the Long-term Irrigated Lands Regulatory Program (ILRP) within the Central Valley Region" ("PEIR") (July 28, 2010). I have also reviewed the "Irrigated Lands Regulatory Program Long-Term Program Development Staff Report (July 2010) and the "Draft Technical Memorandum Concerning the Economic Analysis of the Irrigated Lands Regulatory Program" (July 2010). I have prepared comments on the PEIR that address proposed surface water and groundwater monitoring and management practices.

1. The Alternatives are not Adequately Evaluated

The PEIR does not evaluate the relative effectiveness of the five alternatives in the control of contaminated discharges from agricultural operations in the Central Valley. Furthermore, the PEIR provides no quantitative analysis of the amount of contaminant loading to surface water and groundwater that would result from implementation of the alternatives. These are fundamental flaws of the PEIR that leave the reader with no basis to judge the merits and shortcomings of the alternatives. Because contaminant loads are not quantified, the cumulative impact to water quality cannot be predicted, as discussed in Comment (2) below. Finally, the PEIR fails to provide a basis to determine best practicable control or technology (BPTC) as required by Resolution No. 68-16 (Oct. 28, 1968).

Our brief qualitative analysis of the alternatives is as follows.

Alternative 1, because it is the status quo would fail to reduce contaminant loads and improve water quality and, because it relies on regional or watershed scale monitoring, would not allow for a determination of BPTC. To determine BPTC, monitoring and data comparison is necessary upgradient and downgradient of points of control, i.e., where measures are implemented in the field. Because of the reliance on current management practices and because only regional monitoring is to be used, Alternative 1would not result in measureable improvement to water quality and in fact foster further degradation of water quality.

Alternative 2, which includes some groundwater management practices, would not demonstrably reduce contaminant loads and improve water quality. The groundwater management practices include only token wellhead protection measures involve only the placement of dirt in berms adjacent to the wellhead to prevent movement of surface water to the wellhead. These minor improvements are already required under Title 3, California Code of Regulations Division 6 (effective May 27, 2004) for areas where pesticides are mixed, rinsed and stored. (http://www.cdpr.ca.gov/docs/emon/grndwtr/gwregsinfo0702.pdf) Implementation of these measures more broadly, i.e., at all farms, is not likely to result in significant water quality gains because the berms would only marginally protect against pesticide and nitrate transport in stormwater in the areas where wellheads are located and would not address subsurface transport of pesticides and nitrates.

No farm-scale monitoring requirements are included under Alternative 2 and therefore, a determination of BPTC is not possible. Because only token wellhead protection measures are to be undertaken, Alternative 2, like Alternative 1, would not result in measureable water quality improvements and may be just as likely to result in water quality degradation.

Alternative 3 requires farm plans that use a tiered approach to address water quality concerns. This alternative is an improvement and may result in some gains in water quality; however, because no surface water or groundwater monitoring is required, the implementation of this alternative would not result in measureable improvement to water quality and the lack of monitoring does not allow for BPTC determinations.

Alternative 4 provides for nutrient management and regional or individual monitoring under a tiered hierarchy. Whereas use of tiering is acceptable in determining the intensity of monitoring, the option to participate in regional scale monitoring would not allow for the determination of BMP effectiveness nor BPTC. Costs under Alternative 4 could also be reduced by incorporating groundwater quality information from public water supply systems into a database to compliment the data obtained from Tier 2 and Tier 3 farms that would be required to participate in regional groundwater monitoring. As with Alternative 3, Alternative 4 may provide some gains in water quality; however, those gains would not be measurable because only regional monitoring is required.

Alternative 5 requires surface water and groundwater monitoring at individual farms and would likely be most protective of water quality. Because discharger-scale monitoring

would be required, BMP effectiveness could be evaluated and a determination of BPTC could be made. As monitoring data from BMPs are evaluated, BPTC can be determined and deployed in the field.

The monitoring under this alternative, however, is duplicitous and overly burdensome. Instead, use of a tiering scheme (i.e., to reduce monitoring at low risk farms in low risk environments) would reduce costs as would better coordination between farms in fulfilling monitoring requirements. For example, if groundwater wells were to be installed, groundwater monitoring at neighboring farms could be coordinated with one farm's downgradient well serving as the adjacent farm's upgradient location. Alternative 5, while inefficient, would result in the greatest potential for water quality gains because of the monitoring that would be required at farms.

To properly evaluate the five alternatives, a quantitative estimate of the contaminant loads to surface water and groundwater needs to be integrated into Chapter 3 of the PEIR, Program Description. Additionally, consideration of each alternative's capability to meet BPTC needs to be incorporated into Chapter 3, including specification of monitoring at a scale that allows for the determination of BPTC.

2. Cumulative Impacts on Downstream Ecologic Receptors are not Assessed

The PEIR fails to consider cumulative impacts of the alternatives on ecologic receptors downstream of the agricultural discharges in the Central Valley, namely the Delta and the San Francisco Bay and Estuary. Wildlife in the Delta and the Bay at risk include, for example, special-status fish species such as the Delta Smelt and anadromous fish such as Chinook Salmon and Steelhead Trout. Clearly, contaminant loading of pesticides and nutrients to upstream waters impacts habitat for these fish and their prey yet no consideration of these or any individual species is given in Section 6, Cumulative and Growth-Inducing Impacts. The PEIR states only in Chapter 6:

> Because many of the existing effects discussed in the section "Existing Effects of Impaired Water Quality on Fish" are cumulative, it is difficult to determine the relative contribution of irrigated lands and other sources. For example, low DO in the Stockton Deepwater Ship Channel is a result of contamination from upstream nonpoint sources (possibly including agricultural runoff) and discharges from the Stockton sewage treatment plant (Lehman et al. 2004; Central Valley Water Board 2005). Application of pesticides to non-agricultural lands such as urban parks and the resultant contaminant runoff also cumulatively contribute to impacts of inputs from irrigated lands.

This level of analysis is insufficient and provides no basis for comparison of the cumulative impacts that would result from the five alternatives. Section 6 should be re-written to estimate and incorporate contaminant loads from agricultural practices on irrigated lands to both surface water and groundwater under each alternative. The contaminant loads should be compared to other contaminant loads (other agricultural operations (e.g, dairies) and industrial discharge (e.g., treated sewage discharges) that are

contributed to downstream water bodies, including the Delta and the San Francisco Bay, to predict cumulative impacts from Central Valley irrigated agricultural operations.

Cumulative effects are essential to consider, given the impact of poor water quality on downstream ecologic receptors. For example, pelagic organisms such as the delta smelt are in decline in the upper San Francisco Estuary. The decline is not only because of direct smelt mortality from entrainment at pump intakes but also because of exposure of smelt and smelt prey to toxics and nitrogen. (http://www.sciencedaily.com/releases/2010/05/100517161144.htm and http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/pelagic_organism/docs/pod_ieppodmt_2007synthesis_011508.pdf) Studies have also shown that contaminants, including pesticides, have been linked to the decline of striped bass in the Upper Sacramento River http://www.sciencedaily.com/releases/2008/12/081209100940.htm. Cumulative impacts are also important to consider in the decline of anadromous fish, where contaminants are one factor contributing to significant population reductions (see, for example PEIR p. 5.8-20)

Cumulative impacts are also important to consider in impacts on recreation. For example, the growth of water hyacinth (Eichhornia crassipes) in the Sacramento-San Joaquin River Delta as a result of increased nutrient loads (nitrogen and phosphorus). (http://www.dbw.ca.gov/PDF/Egeria/WHSciProbsExcerpts.pdf) The rapid growth of water hyacinth has resulted in impacts to boating and recreational use by impeding waterway navigation and swimming.

Despite these and other well-known and significant impacts, the PEIR fails to discuss cumulative impacts to water quality, fisheries, and recreation from implementation of the five alternatives. The failure to consider cumulative impacts stems from the fact that contaminant and nutrient loads were not quantified in the PEIR, by alternative, as noted in Comment 1. The PEIR needs to conduct a thorough assessment of cumulative impacts that will include consideration of contaminant contributions from irrigated agricultural lands to surface water and groundwater under each alternative.

3. Surface Water Monitoring Required under Alternatives 4 and 5 is Vague

The PEIR lacks fundamental detail regarding those alternatives where farm-scale surface water monitoring may be conducted (i.e., Alternatives 4 and 5). The PEIR describes Tier 2 and Tier 3 monitoring for Alternative 4 as follows (p. 3-19):

> Tier 2: Individual tailwater, stormwater, tile drainage monitoring for constituents of concern 1 year of every 5 years
>
> Tier 3: Individual tailwater, stormwater, tile drainage monitoring for constituents of concern

The PEIR describes surface water monitoring under Alternative 5 as follows:

Under Alternative 5, each operation would be required to conduct the following monitoring and tracking for each field and submit the results to the Central Valley Water Board annually.

- Discharge monitoring for constituents of concern
- Tailwater discharges monthly.
- Storm water discharges during the first event of the wet season (between October 1 and May 31) and once during the peak storm season (typically February).
- Discharges of subsurface (tile) drainage systems annually. (PEIR, p. 3-28)

The PEIR is vague on how surface water monitoring practices and resultant data would be reviewed stating only that the Regional Board would review and approve monitoring plans of third parties and legal entities and would review monitoring reports (PEIR, p. 3-21). The PEIR does not specify criteria that would define acceptable practices for monitoring including use of appropriate QA/QC, use of state-certified laboratories, methodology for selection of constituents of concern, and required locations for stormwater sampling (i.e., upgradient/downgradient, pre- and post BMP). We understand the PEIR is a programmatic EIR; however, some level of detail is needed in a revised PEIR to evaluate the effectiveness of the farm-scale surface water monitoring that is proposed in Alternatives 4 and 5.

4. Public Health Impacts from Exposure to Contaminated Groundwater is not Considered

More than two million Californians have been exposed to harmful levels of nitrates in drinking water over the past 15 years and the population of those exposed keeps growing. The PEIR acknowledges the extent of nitrate contamination and includes, as Figure 5.9-17, a map that shows nitrate contamination to be concentrated in the Central Valley. Incredibly, however, the PEIR makes no attempt analyze how nitrogen-based fertilizer application in the Central Valley results in significant exposure of the public to contaminated groundwater, the health impacts of that exposure, or how implementation of any of the five alternatives would reduce or increase exposure, other than to say, for Alternative 1:

> Nutrient management would improve both surface water quality and groundwater quality by improving the use of chemicals and using improved application techniques, and by limiting the use of nutrients as fertilizer that could potentially seep to groundwater and add nitrate to the groundwater table. (PEIR, p. 5.9-14)

The assertion that ongoing nutrient management efforts would somehow improve water quality is not borne out by recent data. In fact, the status quo, as proposed in Alternative 1, has resulted in an increase, statewide, in the number of wells that exceeded the health limit for nitrates, from nine in 1980 to 648 by 2007. (http://articles.sfgate.com/2010-05-17/news/20901575_1_nitrate-contamination-water-supply-water-systems) Of 13,153 wells sampled statewide, 1,077 active and standby drinking water wells have

concentrations of nitrate above the drinking water standard of 45 mg/L. (http://www.swrcb.ca.gov/water_issues/programs/gama/docs/coc_nitrate.pdf) In Tulare County, more than 40% of private domestic water wells exceed the drinking water standard for nitrate and statewide, the majority of nitrate exceedences appear to be in the Central Valley. (http://www.swrcb.ca.gov/gama/docs/ekdahl_gra2009.pdf) On the basis of more than 25 years of data, the number of wells that exceed the drinking water standard for nitrate is growing as a percentage of all nitrate detections. (http://www.swrcb.ca.gov/gama/docs/ekdahl_gra2009.pdf) Clearly the status quo is not working and implementation of Alternatives 1 and 2 would likely lead for further increases in nitrate drinking water violations in the Central Valley.

Health effects of exposure to nitrates most notably results in methemoglobinemia or "blue baby syndrome." Toxic effects of methemoglobinemia occur when bacteria in the infant stomach convert nitrate to more toxic nitrite, a process that interferes with the body's ability to carry oxygen to body tissues. Infants with these symptoms need immediate medical care since the condition can lead to coma and eventually death. Pregnant women are susceptible to methemoglobinemia and should be sure that the nitrate concentrations in their drinking water are at safe levels. Additionally, some scientific studies suggest a linkage between high nitrate levels in drinking water with birth defects and certain types of cancer. (http://www.swrcb.ca.gov/water_issues/programs/gama/docs/coc_nitrate.pdf)

The PEIR should be rewritten to include an assessment of the potential for the public to be exposed to nitrates in drinking water from agricultural practices in the Central Valley. The assessment of each alternative should include an estimate of nitrogen loading to fields; nitrogen fate and transport in soil, surface water, and groundwater; nitrogen monitoring; and a summary nitrogen impacts to water supplies. Linking monitoring to measurement of each of the alternatives is critical. An annual assessment of the performance of the alternative that is selected should be required and use of the 13,000-well California Department of Public Health database should be required as a tool for evaluation of nitrate trends.

Sincerely,

Matt Hagemann, P.G.

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Matthew F. Hagemann, P.G., C.Hg., QSD, QSP

Geologic and Hydrogeologic Characterization
Industrial Stormwater Compliance
CEQA Review
Investigation and Remediation Strategies
Litigation Support and Testifying Expert

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certification:

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 25 years of experience in environmental policy, assessment and remediation. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) while also working with permit holders to improve hydrogeologic characterization and water quality monitoring.

Matt has worked closely with U.S. EPA legal counsel and the technical staff of several states in the application and enforcement of RCRA, Safe Drinking Water Act and Clean Water Act regulations. Matt has trained the technical staff in the States of California, Hawaii, Nevada, Arizona and the Territory of Guam in the conduct of investigations, groundwater fundamentals, and sampling techniques.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – present;
- Senior Environmental Analyst, Komex H2O Science, Inc (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

Partner, SWAPE:

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of numerous environmental impact reports under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions and geologic hazards.
- Stormwater analysis, sampling and best management practice evaluation at industrial facilities.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Technical assistance and litigation support for vapor intrusion concerns.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.
- Expert witness on two cases involving MTBE litigation.
- Expert witness and litigation support on the impact of air toxins and hazards at a school.
- Expert witness in litigation at a former plywood plant.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.
- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the dischrge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9. Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt currently teaches Physical Geology (lecture and lab) to students at Golden West College in Huntington Beach, California.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examination, 2009-2011.

KARB

CENTRAL VALLEY

REGIONAL WATER QUALITY CONTROL BOARD

WORKSHOP

EIR SCOPING MEETING

EIR FOR THE REGULATION OF DISCHARGES FROM

IRRIGATED LANDS WITHIN THE CENTRAL VALLEY REGION

HELD AT

CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL
FRESNO, CALIFORNIA

ORIGINAL

WEDNESDAY, MARCH 5, 2003
9:00 A.M.

Reported by:

ESTHER F. SCHWARTZ
CSR NO. 1564

APPEARANCES

STAFF:

PETER OSMOLOVSKY
LONNIE WASS
RUSSELL WALLAS
ANNEE FERRANTI
WILLIAM CROYLE
KELLY BRIGGS

AUDIENCE:

NETTIE R. DRAKE
CINDY FORBES
ORVIL MCKINNIS
JOSE FARIA
JOHN SHELTON
HICHAM ELTAL
DANIEL ROURKE

---oOo---

things. That is what the Board wants to try to figure out, what is the best mechanism or mechanism to manage this.

From my point of view it seems clearly some of these dischargers are de minimis. Waivers are appropriate. Let's move on. And other dischargers may need a lot more management.

MR. FARIA: Right.

MR. CROYLE: I think the effort is trying to flush that out with the information we have and the information we don't have, how we can move forward.

MR. FARIA: The problem is you have to adopt a set of regulations equal for everybody in the state. We have different local conditions that might apply. That is one of the points that may be a problem.

MR. CROYLE: I think that is a good point to make in the context of this meeting, is that your view is there may be different environmental settings or economic settings throughout the basin that needs to be considered in this process.

MR. FARIA: Outside of regulations don't apply for all, a single set of regulations.

MR. CROYLE: If there are no more questions at the moment, I will try to get back to this question. Your question with regard to the implementation plan and the

U.C. Davis monitoring.

Just to give everybody a little background into where we are at. The Board has secured some resources through the State Water Resources Control Board to implement a pilot study for the Board to determine how future monitoring efforts should be managed and looking at irrigated land discharges. There is various ways to look at monitoring approaches.

So the Board has contracted with U.C. Davis to develop this implementation plan. It is a pilot study, short-term in nature. It has about nine months' worth of sampling over a year and a half of data collection and data crunching and report writing. That effort is supposed to be feed data into the environmental review process. And because of the limited time and also the geographic areas centered around Davis and travel time needed to go out and identify sites, take the samples and come back, they went through starting with 85 monitoring sites centered about a hundred miles around U.C. Davis, so they could, if you will, get out and get back within a reasonable amount of time. And if they had toxicity in the sampling, go back out, take more samples and bring them back to the labs within 48 hours.

So the pilot project was developed in kind of a small universe around U.C. Davis so they can develop their

techniques and -- the plan itself, what it cost, is it effective, how much samples do you need, where should we be monitoring, and things like that.

We ended up with 24 sample sites, focused in San Joaquin area, Yolo County, Solano County to look at water bodies that are not main stem. Trying to back off the main stem a little bit. And it is not an effort to look at compliance or look at enforcement actions against irrigated lands; that is not what this is supposed to do. We are going to go out and select the data on a scientifically based method to determine whether these discharges exceed water quality objectives or not, if we have toxicity or not.

There is not a regulatory site to this project. But with respect to those samples and whether you have upstream impacts from other than irrigated lands, they are trying to factor that in to identify the sites. So during this pilot study, it is just the sampling of drains themselves with limited information about the drains upstream. How that relates to a watershed group in the future that might be asked to do similar type monitoring, I think that is going to be up to the watershed group as defined in the conditional waivers, to identify their watersheds, write down the geographic features, whether includes all irrigated lands, whether it has urban

components or not, and the monitoring programming we expect to see, frankly, would need to incorporate those kinds of considerations into the development of that.

A lot of the watershed groups as we have for the past couple of months been talking to, all looking at the main stem, downgradient monitoring. And I think we will be needing to work with a lot of those watershed groups because that is going to tell us a very limited amount of information with regards to what is going on upstream in the watershed. If you have urban components, and quite a few watersheds will, I think Marysville, Yuba City, Chico, some of those areas in the north where we have had these discussions already, where we have potentially significant surface water discharges from urban, plus some water in like effluent dominated water bodies from wastewater treatment plants.

Those aspects of your watershed and drainage need to be incorporated into your monitoring program, which would be upgradient, downgradient pathways from those urban sources. Especially if you are going to try and tease out the part of what irrigated land is responsible for or not. If comes out to be 10 percent of the overall level of constituents within the discharge is the responsibility of the irrigated lands, obviously a lot of work has to come from the urban side in the watershed group. That is kind

MEETING

STATE OF CALIFORNIA

CENTRAL VALLEY REGIONAL

WATER QUALITY CONTROL BOARD

CENTRAL VALLEY REGIONAL

WATER QUALITY CONTROL BOARD

11020 SUN CENTER DRIVE #200

SACRAMENTO, CALIFORNIA

APRIL 7, 2011

LISA SCHAFER, CSR 12723
CERTIFIED SHORTHAND REPORTER

we received that letter last night that had already distributed to the Board members. If you want, we can bring up those copies right now for your convenience, otherwise, if you already have them --

CHAIRPERSON HART: I have mine and I read it, but I don't know other Board members need a copy.

I'm seeing none. If you want to make them available for the public folks.

PUBLIC ATTENDANCE CARDS: I just brought them as a courtesy knowing staff got in a lot of things in last night.

CHAIRPERSON HART: Yes, thank you.

PUBLIC ATTENDANCE CARDS

PUBLIC ATTENDANCE CARDS: Good afternoon, Madam Chair, Board members, Bill Jennings, California Sport Fishing Protection Alliance. And I would first like to mention that that -- as to the letter, somehow the restoration federation citizens complete the refuge and grizzly fight, but paid craw fishers did not get on there, they signed up later so, that it's more.

But, I wanted to include it in the reference. In the late 1980's Mike (inaudible) and myself prepared the initial petition, filed the initial lawsuit, wrote the legislation that, as chartered, Sunset existing the 1982 waivers. Eighty-eight, almost eight years ago, I

testified before this Board that the proposed 2003 conditional waiver was flawed, would not improve water quality, just some (inaudible) work. Today this Board cannot quantify a single molecule pollution has been prevented; a single BMP would have been implemented, or a single management measure that has been affected -- effective. And I might refer to that, that it's -- let's not keep in mind that the use of guideline collapsed when the cheaper more toxic rethoids came on to the market. That means that the Coalition had nothing to do with that.

After -- after (inaudible) years, the best phase supervisor charges a program, can pronounce a record that says, and I quote, "It's difficult to just say if things improved or have they not. I would say it's too early to really quantify how much things have improved, and we're not seeing poor quality getting worse," unquote.

Well, but it's bad. The board (inaudible) reporting knowledge is a virtual (inaudible) monitor sites downstream of agricultural areas of L.A. water quality standards, 63 percent of the experienced toxicity, often from multiple species, pesticides standards been exceeding more than half the sites often from multiple pesticides, metal violating criteria,

66 percent metal (inaudible), in '87 in more than 80 percent of the sites violated general parameters.

You know, the proposed framework is a bureaucratic Taj Mahala that's being proposed is simply ineffective. Under its Board can't know, (inaudible) specific basis. So, what is discharging, what or how much is being discharged, the localized impacts?

If being BMP's had been implemented or if the implemented BMP's are affected, it will not provide the information necessary to establish and evaluate milestone, performance measures, feedback groups, or consequences for noncompliance. I mean, these are the necessary -- necessary information you need for compliance with an ongoing source policy. This (inaudible) framework is unaccountable.

Coalitions have served as shields, preventing this Board from identifying which farmers are doing the right things from the bad actors. The framework is unenforceable as Board's enforcement powers are limited to actual dischargers. Staffs enforcement, to date, has been limited to requiring farmers to join Coalitions where they disappear behind a shield of anonymity. And behind that shield, no farmer has ever been held accountable for failing to implement measures to reduce pollution.

The proposed framework is unarguable, pollution's not free, someone always pays, and their health, and their pocketbook, and their (inaudible) environment. Their proposed framework is simply a transference of adverse production costs from farmers to the general public.

This Board recently required the citizens of Stockton to spend more than a billion dollars to improve their Waste Water Treatment Plant. It required a similar outlay from the City of Stockton, and the results were dramatic and immediate. We went from 30-to-35 milligrams a liter of ammonia to the low single digits. We saw that immediate results in dissolved (inaudible) levels in the deep water channel. Every other Sacramento society has to monitor discharges and document measures taken to reduce or eliminate pollution. Everybody but agriculture, which gets a free ride, a license to pollute.

Regulation works. I mean, drive past a construction site and you'll see the BMP's. Exam the Board files and you'll find monitor results in the measure implemented by municipalities, by industry, or by the junkyard down the street. I mean, we maintain a docket of storm water enforcement cases against bad actors, but, you know, for every case we file, we find

dozens of businesses in compliance; they can document their BMP's and demonstrate reductions in pollutant loading. Irrigated agriculture remains a (inaudible) unaccountability, black hole. The Coalitions produced a blivit of reports: (inaudible), inflated claims, wishful hope, but we have no documented progress. Our water ways are polluted, Central Valley Fisheries are collapsing, the Delta's aquatic tapestry is disintegrating, it's time for this Board to adopt a single, simple regulatory program. Thank you.

PUBLIC ATTENDANCE CARDS: Good afternoon. My name is Steven bond. I'm a member of the California Sport Fishing Protection Alliance. Their address is part of the record. And I have taken the oath. I'm also a (inaudible) geologist, I specialize in water quality, water chemistry groundwater, engineering (inaudible), and I got professional licenses for these practices. And I have a (inaudible). 11 of those years were in the (inaudible) of this regional board. My experience includes the development, preparation modeling in review of hundreds of water quality monitoring programs involving surface water, groundwater systems, capacity of a regulator, as a consultant, and as an expert before State and Federal Courts. And I have several opinions I'd like to share

with you.

It is my professional opinion that the IRP, as an enforceable program, is without merit, it lacks (inaudible). The polluters are in effect and not accountable for actions or inactions; it is without actual monitoring, associated with the sources of pollution.

The identity of a location of the discharges of pollution are allowed to hide behind the Coalition shield and are identified only through third-party groups who are, themselves, not accountable. In contrast, traditional monitoring does have merits. Traditional monitoring is enforceable. It holds the makers of pollution accountable for their pollutants within a structure of goals and time schedules with milestones for compliance. And these are some of the things which the hierarchy does not have.

Now, regarding monitoring, my professional opinion is that one cannot protect water quality without representative monitoring. Protecting water quality is the function of the ability to determine the condition of the State's waters and comparing contrast or quality with the standards and goals to find in the basin plan, as if you didn't know that.

It is not possible to protect the beneficial

uses of waters in the State without monitoring waters on the pollutants (inaudible) and yet the current plan proposes no representative monitoring. It is my professional opinion that one cannot evaluate the effectiveness of a technology or practice without measurement. Evaluation requires that the change in water quality attributable to the specific practice or technology be measured, but this program fails to require this basic requirement.

My professional opinion is that it is not possible to evaluate the effectiveness of a water trutin (phonetic) system or of a management practice from distant downstream monitoring location. In such cases (inaudible) other sources of pollution made changes in the water quality or a practice in technology that is discernable at the edge of the field are masked within a suit of other waters and pollution and the performance of the practice the BMP essentially unknowable, and yet, that is the State and condition of this program.

It's not surprising that most of the waters fall into Tier 2. My professional opinion is that it is a complex -- that it's in a complex watershed composed of sub watersheds. Water samples from distant downstream locations such as -- most of the marking

locations in this program are not valid representations of the water quality in any or all of the visible sub watersheds. While gross average conditions may be observed, downstream, the condition of individual upstream sub watersheds will remain unknowing. Between the downstream monitoring station and the various upstream watersheds, mixing a dilution occurs and a condition at any upstream point are obscured to a downstream monitoring location, and yet, that is the state of majority of the programs monitoring. The most basic step of rectifying the condition of (inaudible) waters is to identify it. The points of discharge, all of the points of discharge, and monitor the quality and quantity of those waters from the edges of the fields.

Traditional monitoring is enforceable, holds an acre of pollution accountable for the pollution within a structure of goals and time schedules for compliance.

PUBLIC ATTENDANCE CARDS: Hello, Board members, my name is Joanne Kipp. I am on the Sea-saw Advisory Counsel, and I have taken the oath.

I'm a California Registered Civil Engineer, and I worked for the Central Valley Water Board for over 12 years in the NTBES and WDR regulatory programs. As a senior water resource control engineer, I supervise staffs presentation, preparation of waste is our

inadequate regional monitoring scheme that cannot and will not provide information to this Board necessary to characterize current conditions, let alone, monitor the effectiveness of best management practices as these are implemented. And perhaps, most importantly, it makes enforcement against those dischargers responsible for causing the pollution improbable.

Without enforceability, the frameworks recommended programs essentially voluntarily one that cannot and will not protect water quality. Because irrigated agriculture has caused a wide spread groundwater nitrate pollutions, in my professional opinion, that the program must consider all irrigated agricultural operations as opposed to a high risk to groundwater, unless and until proven otherwise.

The program should require all growers to submit data on their supply wells for nitrate and other constituents of concern. This data is necessary to establish baseline conditions and to evaluate the effectiveness of improved nutrient management.

PUBLIC ATTENDANCE CARDS: Chair Person Hart, Board members, I'm Richard McHenry. I am civil engineer, I'm here today representing the California Sportfishing Protection Alliance.

And I have taken the oath.

I work for the State and Regional Water Board's for about 23 years. Much of that time was spent as a senior engineer in the MPDS unit overseeing permits for waste water discharges to surface waters. My final assignment with the Board was as senior engineering specialist in the Office of Enforcement and the State Water Board. I have considerable experience in developing waste water discharge permits, investigating water quality issues, and developing enforcement actions for both permitted and un-permitted discharges.

The recommended irrigated lands regulatory program framework proposes that regional monitoring be conducted, not monitoring at individual discharge points. My professional opinion is that enforcement against an individual discharger cannot be based on regional monitoring, it must be proved that if the specific discharger caused this specific problem or violation. In this case, regional impacts could then cause, by any number of upstream dischargers or circumstances, and cannot be directly linked to any specific discharge point.

Based on the regional monitoring that is being proposed, I cannot see any reasonable means of taking enforcement against individual dischargers to effectively protect water quality. I cannot -- I can

also not see any means of utilizing the regional monitoring to evaluate the effectiveness of the farms specific invest management practices. In summary, there is currently sufficient data showing that agricultural discharges are degrading water quality. But the data is insufficient to show the precise discharge points causing the problems or to determine if any corrective measures are effective.

Regional Board has qualified engineers, geologists, and scientists. And given the right tools, they have the ability to solve these water (inaudible)problems. They do not have the proper tools now, and the proposed program does not give them the proper tools.

Under the proposed programs, it is unlikely that progress will be made to improve water quality. Thank you.

PUBLIC ATTENDANCE CARDS: Members of the Board, I've already identified myself, and I've given you my location.

Just for the record, I wanted to exhaust the point that the framework is subject to CEQA. It is a project, it is a program. Whether it's by direction or resolution, a proposition will be subject to CEQA.

As you can tell, we're not big fans of the

3.2.6.1 Responses to Letter 107

107-1

See Comment Letter 41, Response 1.

107-2

Alternatives 2–6 require tracking of management practices implemented to comply with the ILRP. In order to enroll in the ILRP, operations would be required to certify that practices implemented do not involve impacts on a sensitive resource unless mitigation measures are implemented. Operations implementing practices that impact sensitive resources would be required to report on implementation of mitigation measures.

Operations choosing to implement management practices for compliance with the ILRP that would impact a sensitive resource but do not implement mitigation measures would not be eligible for enrollment in the ILRP. These operations would be required to work individually with the Central Valley Water Board to obtain regulatory coverage for their waste discharge.

See Master Response 6.

107-3

The purpose of the ILRP is to regulate irrigated agricultural waste discharges to surface or groundwater. However, the ILRP does not require that the amount of each participating contribution to a water quality problem be determined. If a water quality problem (e.g., degradation occurring, or not meeting objectives) exists, operations that potentially contribute to the problem are required to minimize their waste discharge. If the selected ILRP alternative's monitoring program is regional in nature (i.e., individual field effects on receiving waters are not monitored), it is not possible to determine whether and how much each operation is contributing to the problem—water quality assessment and feedback mechanisms are based on the watershed-scale for multiple sources. Therefore, the ILRP requires that operations that *potentially* contribute sources to the problem implement management practices designed to minimize their contribution. Often times the cost of conducting a source control study may be greater than the cost of implementing measures to minimize waste contributions. Local third-party groups would need to weight this consideration in determining whether to focus on source control or studies in program implementation. However, where agriculture is not a source, the ILRP would not require implementation of practices. Also see Comment Letter 100, Response 40. The overarching regional plan described is an optional plan that could be developed and funded by participating entities within a watershed or area.

Agricultural operations that do not wish to participate in implementing practices under the ILRP have the option to file a report of waste discharge and obtain individual waste discharge requirements. These requirements would specify individual monitoring of effluent and/or receiving waters designed to ensure that the operations waste discharge does not cause or contribute to an exceedance of water quality objectives and that BPTC is implemented where there is degradation of a high quality water.